TeM

Technical Manual

Frigus SF 300-C1

Z1321173-01en

WARNING

Read and follow all safety precautions before working on or near this equipment.

Read all safety precautions throughout this manual and on safety signs attached to this equipment. Failure to follow all safety precautions could result in death or serious injury.

Tetra Pak

Doc. No. TeM-Z1321173-01en

This document was produced by:

Shanghai Tetra Pak Hoyer Ice Cream Machinery Co., Ltd.
1018 Dong San Li Qiao Road
100125 Shanghai
P.R.China

Additional copies can be ordered from Tetra Pak Parts or the nearest Tetra Pak office. When ordering additional copies, always provide the document number. This can be found in the machine specification document. It is also printed on the front cover and in the footer on each page of the manual.

Doc. No. TeM-Z1321173-01en

Issue 2007-02

This manual is valid for:

Series No./ Machine No. Sign.

TeM
Technical Manual

Frigus SF 300-C1
Z1321173-01en

A list of all optional equipment, optional kits, and rebuilding kits that this manual is valid for is found on the next page.

Doc. No. TeM-Z1321173-01en

Issue 2007-02

Tetra Pak

Shanghai Tetra Pak Hoyer Ice Cream

Valid for:

Update Log for Doc. No. TeM-Z1321173-01en

This table shows all changes made to this manual, such as kits installed and pages added or removed.

Date	Installed Kit	Added Pages (Doc. No.)	Removed Pages	Signature

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i Introduction

General informations about Introduction section

This chapter contains basic information about this manual and related Tetra Pak equipment.

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i.1 About the introduction chapter

Risk of serious personal injury. To ensure maximum safety, always read the chapter “Safety precautions” before operating or servicing the machine or equipment.

This chapter contains basic information about this manual and related Tetra Pak equipment.

i.2 Abbreviations and Terminology

Abbreviation/ Terminology	Meaning	Translation
CIP	Cleaning In Place	
SPC	Spare parts catalogue	

i.3 Manual information

Tetra Pak recommends that delivered documentation should be studied carefully and always kept available to those who will operate the machine or equipment.

It is important to keep the manual for the life of the machine or equipment and pass the manual on to any subsequent holder or user.

Tetra Pak will not be held responsible for any damage to the machine or equipment caused by not following the instructions given in this manual.

i.3.1 Delivered Manuals

The documents delivered with this machine or equipment include:

- Electrical Manual (EM)

  The purpose of this manual is to provide the service technicians and electricians with information required for service and maintenance
- Installation Manual (IM)

  The purpose of this manual is to provide installation personnel with the information required for installation
- Maintenance Manual (MM)

  The purpose of this manual is to provide the service technicians with information required for maintenance and service
- Operation Manual (OM)

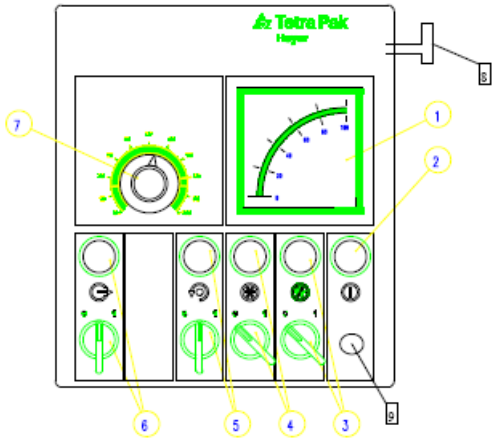
  The purpose of this manual is to provide the operator with information on how to handle and operate the machine or equipment before, during, and after production
- Spare Parts Catalogue (SPC)

  The purpose of this manual is to provide necessary information for ordering spare parts from Tetra Pak
- Technical Manual (TEM)

  The purpose of this manual is to provide necessary information required for installation, service and maintenance

i.3.2 Page Layout

Every main page in a manual contains a header and a footer. The page header contains the section name (2) and the chapter name (1). The page footer contains the manual's document number (3), and the page number(4). See also the section Page Numbering.



Instrument indicating load on dasher, Pos. 1.

Lamp indicating control current, Pos. 2.

Switch for hot gas open/close and lamp for indication, Pos. 3.

Switch for stop/start of refrigeration and lamp for indication, Pos. 4.

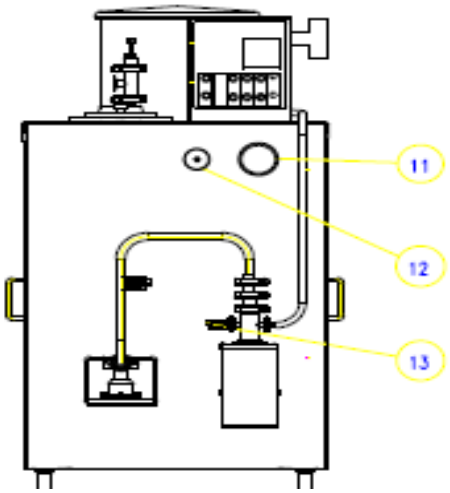
Switch for stop/start of dasher and lamp for indication, Pos. 5.

Switch for stop/start of air/mix pump and lamp for indication, Pos. 6.

Potentiometer for control of air/mix flow, Pos. 7.

When emergency occurs, press emergency stop button, Pos.8, immediately

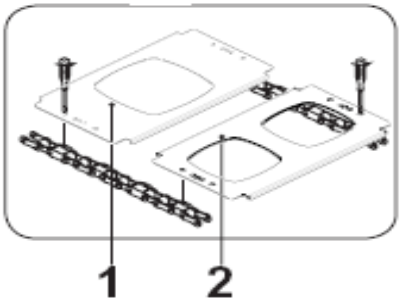
When emergency stops, press reset button, Pos.9.



i.3.3 Page Numering

A page number has three parts:

- chapter number (1)
- consecutive page number (2) within the chapter
- total number of pages (3) in the chapter.



1 Chapter number
2 Consecutive page number
3 Total number of pages

i.3.4 Typographical Conventions

Controls on the operator panel, emergency stop devices, and program steps are printed in CAPITAL LETTERS.

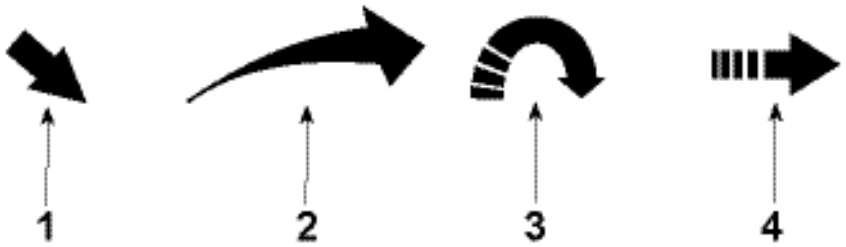
Cross-references are underlined.

i.3.5 Symbols

The following symbols are used in illustrations:

- A pointer arrow (1) indicates the position of an object.
- A zoom arrow (2) indicates that an object view is enlarged. The arrow points towards the enlarged view of the object

1 Pointer arrow
2 Zoom arrow
3 Rotation movement arrow
4 Straight movement arrow



i.4 Machine Introduction

i.4.1 Intended use of the machine or equipment

The intended use of this Tetra Pak machine or equipment is to inject fruit pieces, nuts, candies and other free flowing granulates into ice cream or similar products.

All other use is prohibited! Tetra Pak will not be held responsible for injury or damage if the machine or equipment is used for any other purpose.

i.4.2 Manufacturer

This Tetra Pak machine or equipment has been manufactured by:

Shanghai Tetra Pak Hoye Ice Cream Machinery Co., Ltd.
1018 Dong San Li Qiao Road, Pudong
Shanghai 100125
P.R.China

i.4.3 Service

If problems are encountered when operating this machine or equipment, contact the nearest Tetra Pak centre or market company.

Contact this mail address, if you have any questions regarding the documentation:

ProductDocumentationBUIC@tetrapak.com

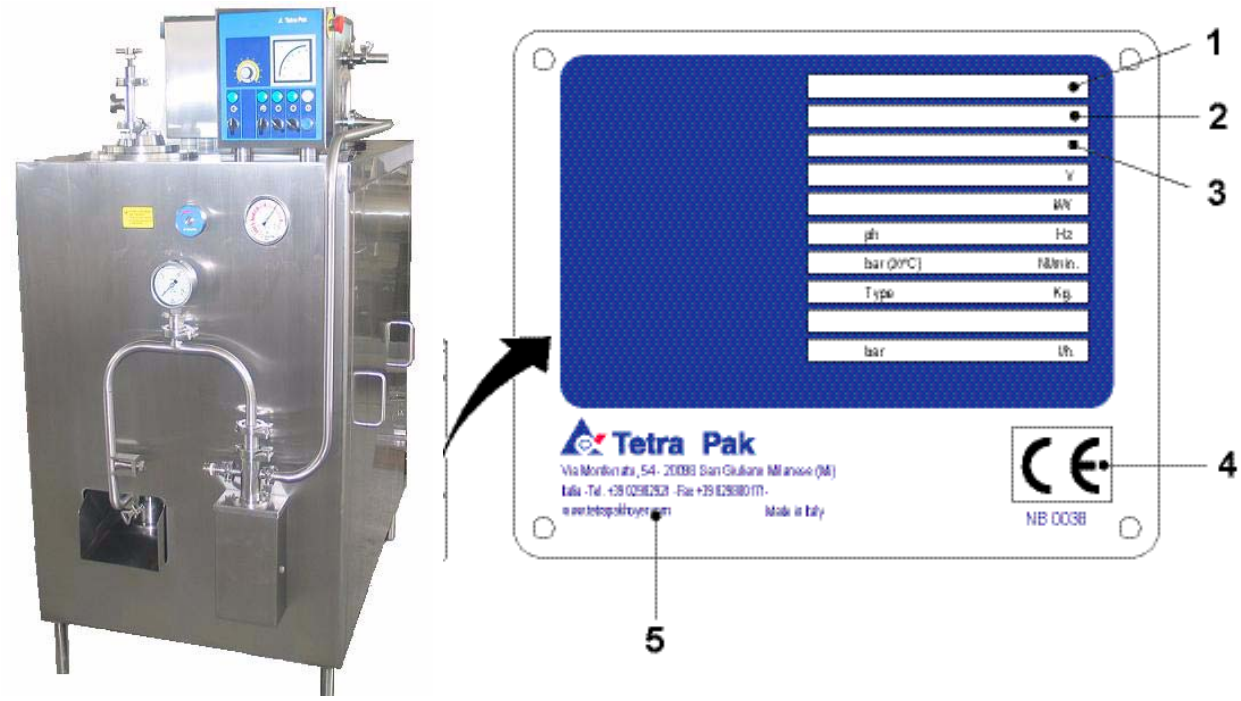
i.5 Identification

i.5.1 CE classification

This equipment complies with the basic health and safety regulations of the European Economic Area (EEA).

i.5.2 Machine plate

The below illustration shows an example of the machine plate and its location on the machine or equipment. The machine plate carries data needed when contacting Tetra Pak concerning this specific machine or equipment.



1 Machine type
2 Machine serial number
3 Year of manufacture
4 CE mark
5 Manufacturer

i.6 Orientation

The illustration below shows the orientation of the equipment. This orientation information will be used throughout this manual.

A Front
B Right-hand side
C Left-hand side
D Back

i.7 Hygiene

Ice cream production, like other foodstuffs, requires high sanitary standards. That is why the strictest demands should be made on cleaning of devices and tools getting in touch with the ice cream, ingredients coating and packaging materials. In addition, the production area should be kept very clean.

Personal hygiene should also be considered as a part of the sanitary standards:

- Personal body hygiene
- Headgear
- Hygiene of work clothes
- Hygiene of footwear
- Hand hygiene

ALWAYS make sure that the detergents and disinfectants applied are approved by the local authorities.

NEVER use a detergent which chemical properties will damage the metals and alloys to be cleaned.

i.8 How to Use This Operation Manual

Purpose of the operation manual

The operation manual provides operators with information on handling and operating the equipment before, during, and after production.

Operator workflow

Beginning with Chapter 1, the content is structured to follow the operator workflow, as described below.

Preparation cycle

a) Preparation

Production cycle

b) Start

c) Checks

d) Supply of Materials

e) Conversion

f) Change of Product

g) Stop

Care

h) care and cleaning

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ii Safety Precautions

ii. IRead the safety precautions 2 - 9

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ii.1 Read the safety precautions

All persons operating, servicing, adjusting or otherwise working with or near this machine or equipment must carefully read and follow all safety instructions in this manual and warning signs on the machine or equipment itself. Failure to do so could result in death, serious injury, and damage to the machine or equipment.

Call for medical attention immediately in case of an accident.

ii.2 Safety Messages Description

A safety message is always accompanied by a safety alert symbol and a signal word.

This is the “safety alert” symbol. It is used to alert about potential personal injury hazards. Obey all safety messages that follow this symbol to avoid death or injury.

The following safety alert symbols and “signal words” are used in this manual and on the machine or equipment itself to inform the user of hazards.

DANGER
indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

CAUTION
(without the safety alert symbol) indicates a potentially hazardous situation which, if not avoided, may result in property damage.

ii.3 Personnel requirements

Note! Personnel includes **all** persons performing work on or near the machine or equipment.

Only skilled or instructed persons are allowed to work with the machine or equipment.

ii.3.1 Skilled person

A skilled person must have relevant education and experience to enable him or her to identify hazards, analyze risks, and avoid hazards which electricity, mechanics, chemicals, and supply systems can create.

Skilled persons must meet local regulations, such as certifications and qualifications for working with electricity, mechanical systems, and so on.

ii.3.2 Instructed person

An instructed person must be adequately advised or supervised by a skilled person to enable him or her to identify hazards, analyze risks, and avoid hazards which electricity, mechanics, chemicals, and supply systems on the machine or equipment can create.

ii.4 Safety signs

ii.4.1 Safety Signs

WARNING

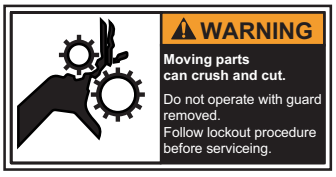
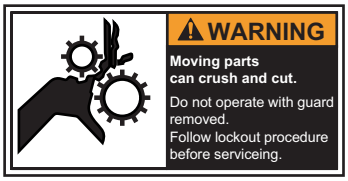
Hazards without safety signs drastically increase the risk of death or serious injury.

Replace all missing or damaged safety signs immediately.

There are two types of safety sign

- ISO signs are used in most markets
- ANSI signs are used in the US market only

The table below shows all safety signs that are located on this machine/ equipment.

ISO sign	ANSI sign
 Hazardous voltage. Will cause death or serious injury. Disconnect power before servicing. Lockout machine.	
 Moving parts can crush and cut. Do not operate with guard removed. Follow lockout procedure before servicing.	

ii.4.2 Location of safety signs

Note! Always ensure that all safety signs on the machine or equipment are undamaged and in their correct position after installation and maintenance.

The illustration below indicates where the safety signs are located.

ii.5 Protective devices

DANGER

Unshielded hazards. Never inch or run the machine or equipment if any component of the safety system is inoperative. All inoperative components of the safety system must be changed immediately.

Note! Activating a safety device, such as an EMERGENCY STOP, or opening an interlocked safeguard does not switch off the power supply to the machine or equipment.

ii.5.1 Emergency Stop

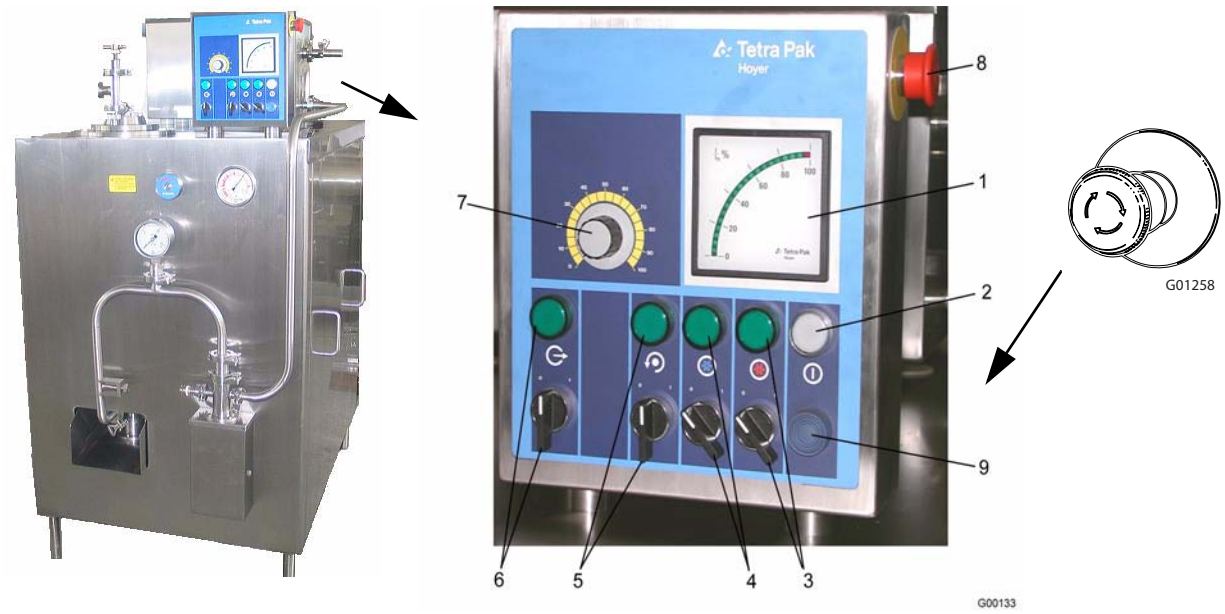
Learn the positions of the EMERGENCY STOP devices in order to stop the machine or equipment immediately in case of an emergency situation.

To stop production the normal way, see the *operation manual*.

ii.5.2 Emergency stop push buttons

Push one of the EMERGENCY STOP push buttons to stop the machine or equipment immediately.

The illustration below shows an emergency stop push button. Arrow(s) indicates where to find them on the machine or equipment.



ii.6 Personal protection

Note! Personal protection required when handling hazardous materials is specified for each substance, see the section “Hazardous materials”.

ii.6.1 Hearing Protection

WARNING

Hazardous noise level. Risk of impaired hearing. Wear hearing protection.

CAUTION

Hazardous noise level. Risk of impaired hearing. Hearing protection is recommended.

ii.6.2 Risk of entanglement

WARNING

Risk of entanglement. No jewellery such as rings, watches, bracelets, or necklaces may be worn when performing work on or near the machine or equipment.

ii.7 Hazardous materials

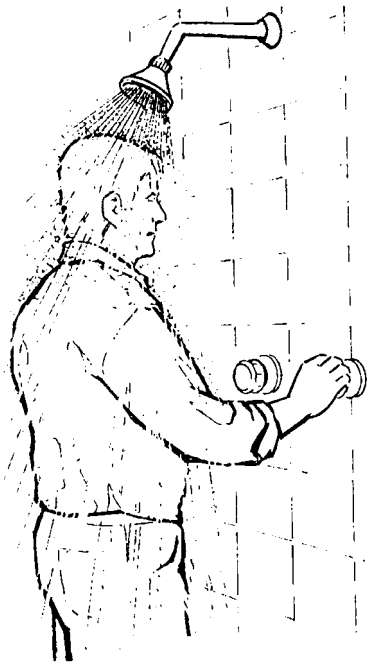
WARNING

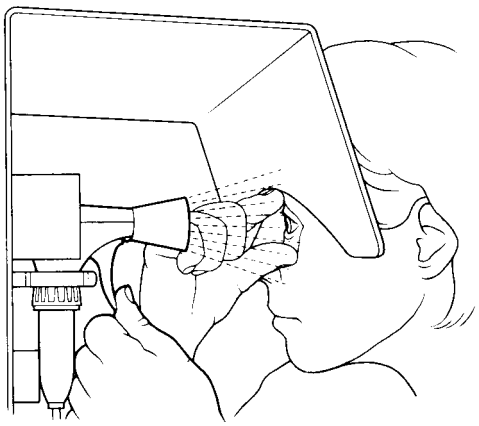
Contact with chemicals can cause injury and illnesses. Always follow the manufacturer's instructions when handling chemical products.

Always make sure that

- the showers work
- an eyewash device, movable or wall-mounted, is available and operational
- additional washing facilities are nearby

Note! Learn the positions of all washing facilities in order to act without delay in case of an accident.





ii.7.1 Products for cleaning and sterilization

The cleaning of the machine and its components previews to use of chemical products. The following table indicates the various type of recommended products.

Detergent	Descaler	Disinfectant
SU928 (Diversey Lever)	P3-topax 99 (60°„C) (Henkel Ecolab)	P3-topax 99 (60°„C) (Henkel Ecolab)
SU616 (Diversey Lever)	SU475 (Diversey Lever)	SU330 (Diversey Lever)
SU157 (Diversey Lever)	P3-PE4 Spezial a (Henkel Ecolab)	P3-Dix forte (Henkel Ecolab)
P3-N421 (Henkel Ecolab)		P3-Oxjsan (Henkel Ecolab)

WARNING

Corrosive chemical.Wear personal protective equipment.Consult the instructions on the label of the tank/container, or on the security card of product.

In both liquid and gas states, products for cleaning and sterilization may cause irritation or damage if it comes into contact with skin, mucous membranes, eyes, or clothes. Call for medical attention immediately if there is an accident.

Emergency Procedures

If there is an accident involving the products for cleaning and sterilization, rinse the affected area as soon as possible with large amounts of water. If the products for cleaning and sterilization is swallowed

- do not attempt to cause vomiting
- drink large amounts of lukewarm water to dilute the peroxide call for medical attention immediately.

If splashes or vapour from products for cleaning and sterilization come in contact with the eyes

- wash the eyes thoroughly with lukewarm water for 15 minutes (keep eyelids wide apart)
- call for medical attention immediately.

If products for cleaning and sterilization comes into contact with skin or clothes

- rinse immediately with plenty of water
- call for medical attention immediately if skin burns appear
- thoroughly wash the clothes before wearing them again.

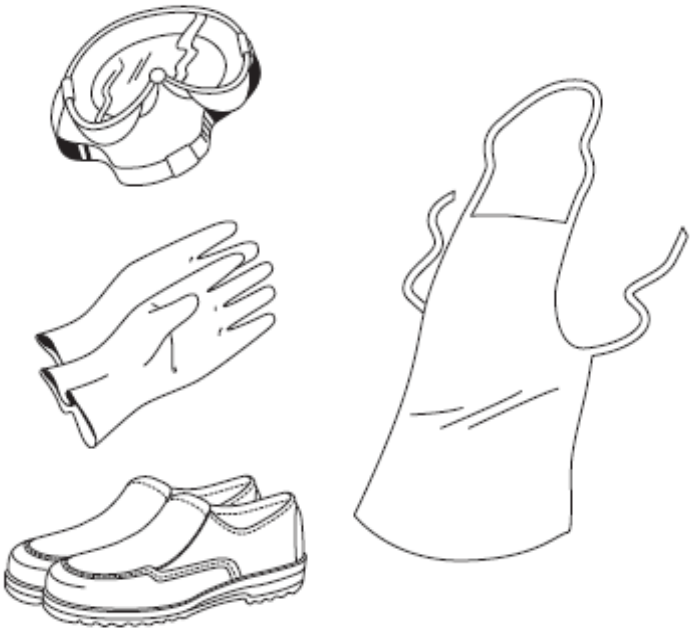
If irritation or pain is experienced due to having inhaled products for cleaning and sterilization vapour

- leave the affected area and get some fresh air
- call for medical attention if the symptoms get worse.

ii.7.2 Personal Protective Equipment

The personal protective equipment for products for cleaning and sterilization is

- safety goggles.
- protective gloves made of neoprene.
- apron
- shoes made of PVC, PE plastic, or rubber.



Handling

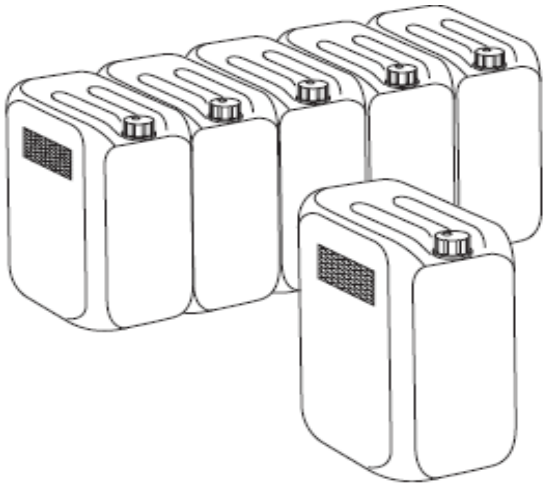
WARNING

Sudden and violent chemical reaction.Avoid any contamination of products for cleaning and sterilization.

The products for cleaning and sterilization they can react suddenly and violently with many compounds or if it is contaminated.

Ensure that equipment used for handling and diluting the products is clean before it comes in contact with the products. Pumps or other equipment used for handling the products must be used for this purpose only and must be manufactured from appropriate materials, such as stainless steel 316 L, glass, polyethylene, or tefl on. After use, make sure that all product residue is rinsed away.

If products for cleaning and sterilization is spilled, dilute it with large amounts of water and fl ush it into a drain.



Storage

The products for cleaning and sterilization must be stored in the original container delivered by the supplier.

Keep the container upright and fitted with its proper cap.

Make sure that the area used for storage of products for cleaning and sterilization is:

- cool, clean, and well ventilated
- shielded from direct sunlight
- kept free from combustible materials.

ii.8 Supply systems

ii.8.1 Electrical cabinet

DANGER

Hazardous voltage. Electric shock will cause death or serious injury.

The power supply disconnecting device must be turned OFF and secured with a lock before any service is carried out inside the electrical cabinet

Note! The key to the lock must be removed by the service technician or the electrician, and retained in his/her possession until all work is completed.

Make sure that the electrical cabinet doors are locked after performing any work in the electrical cabinet.

An arrow in the illustration below indicates the location of an electrical cabinet.

ii.8.2 Power supply

DANGER

Hazardous voltage and moving machinery. The power supply disconnecting device must be turned OFF and secured with a lock before any service is carried out.

Note! The key to the lock must be removed by the service technician or the electrician, and retained in his/her possession until all work is completed.

Certain maintenance procedures require supply systems to be turned on. These exceptions are clearly stated in the maintenance manual.

The illustration below shows the power supply disconnecting device and the arrow indicates its location.

ii.8.3 Air Supply

WARNING
Compressed air. Close the main air valve before any maintenance.

Certain maintenance procedures may require the air supply systems to be on.

These exceptions are clearly stated in the Maintenance Manual.

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1 Installation

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1.1 General Description

Frigus 300 is a simple and robust continuous ice cream freezer, designed and built according to the latest guidelines for hygienic food processing machinery. All food-interfacing surfaces are made in stainless materials (stainless steel, hard chromium-plated stainless steel, hard chromium-plated nickel, and EPDM rubber). The design also ensures that all food-interfacing surfaces are easily cleaned.

The ice cream freezer has detachable side panels which enables a more efficient cleaning, inspection and maintenance.

The freezer consists of the following main parts:

- mix balance tank
- air/mix pump
- freezing barrel with dasher, beater, and scraper blades
- freon refrigerating system
- control panel.

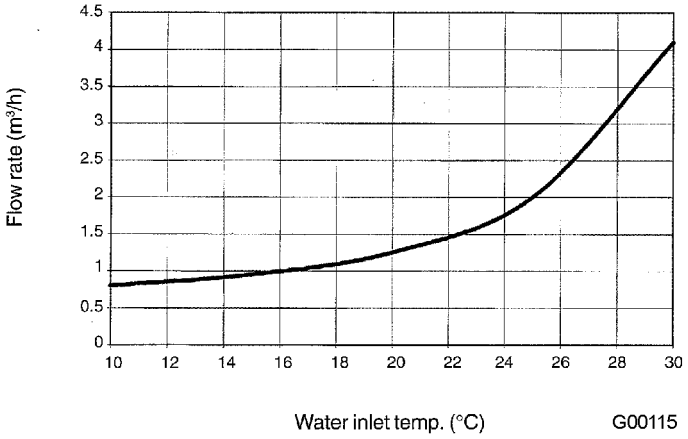
1.2 Technical Data

Shipping data:	
Net weight	750 kg
Gross weight	900 kg
Volume	2.9 m^3
Weight, ready for operation	750 kg
Maximum weight per leg	250 kg
Mains connection, 50 Hz, 3 Phases	415V
Power consumption	10 kW
Refrigerant, weight (R404A)	8 kg
Cooling water, consumption:	
a) Water inlet temp. 10°C / outlet temp. 25°C See also figure “Water consumption” on page 17	0.8 m^3
Pipe dimensions, external measures:	
Mix inlet pipe	25 mm
Ice cream outlet pipe	25 mm
Cooling water	3/4 inch tube
Freezing capacity	6.3kW 5400kcal/h
Pump capacity (nominal output)	35-200 litres/h
Ice cream capacity	300 litres/h
Prerequisites:	
Mix temperature	+5°C
Ice cream temperature	-5°C
Conden temperature	+35°C
Dry matter content, note 1	38%
Overrun	100%
Number of operators	1

Note! 1:Fat (HCO) = 10%, Skimmed milk powder = 10,5%, Sugar (sucrose) = 12,0%, glucose syrup = 5.0%, Stabilizer/emulsifier (Danice) = 0,5%. Total solids = 38,0%. Water = 62%

All pressure denominations in this manual are expressed in bar and “excess pressure” unless otherwise stated.

Water consumption / flow rate:



1.3 Reception

The machine is packed in wooden crates. Unpacking must be done close to the installation position. The cases may be easily transported by a lift truck.

If the crate has been damaged during transport, notify the insurance company, and also the shipping agent and Tetra Pak Hoyer immediately and do not proceed with removal of packaging until authorised by the insurance company.

When the crate is positioned in the place of installation, proceed to remove the machine from its packaging.

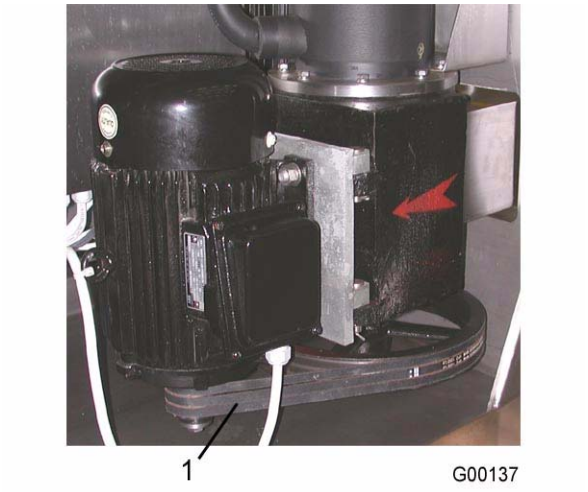
- Check that the consignment corresponds to the order.
- Immediately inform Tetra Pak Hoyer in case of any irregularities.
- Make sure that all covers and panels are correctly fastened in place and there are no loose parts.
- Visually inspect all electrical components to make sure they are in perfect condition.
- If any part or components is missing, notify Tetra Pak Hoyer immediately.

1.4 Installation Instructions

The machine is fully tested and regulated in the factory with about one hour of ice cream production prior to shipment to the customer. Installation simply involves connecting up the pipes for the condenser cooling water supply, ice cream mix intake and outlet, compressed air supply and electric power supply. There is no need for internal adjustments to the machine; we recommend that the factory settings are not changed.

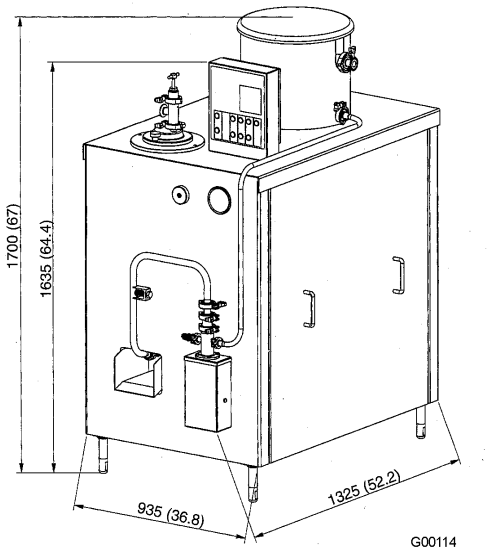
Install the freezer and level it by adjusting the legs.

Tighten the main motor belt, pos. 1.



Main motor belt

Note! The freezer is shipped with all valves of the refrigerating system in the optimum working position.

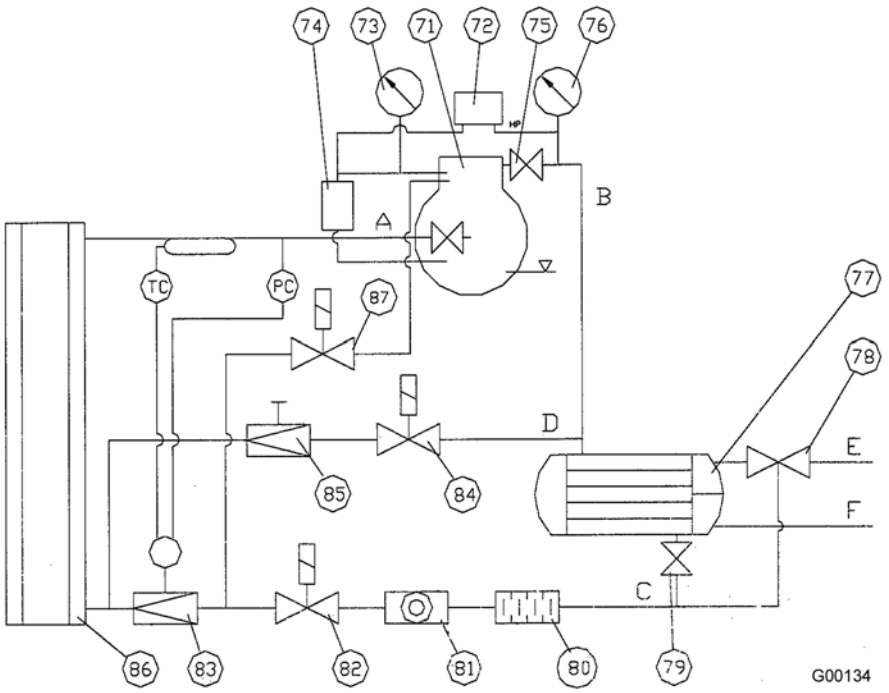


1 Main dimensions in mm(inch)

1.5 Connection to cooling water

Connect the factory's water supply to the condenser's inlet pipe, "E" in "Refrigerating system"

Refrigerating system



The condenser inlet pipe features a pressure-controlled valve that reduces the consumption of water.

Connect the water drain pipe, "F".

Note! The diameters of the connecting pipes must not be smaller than the diameters of the machine pipes, and they must not be throttled.

1.6 Connection, mix inlet/outlet

The feeding pressure from the mix tank to the mix balance tank must be a constant 0.5-1.5 bar.

The ice cream outlet must be to a pipe system that is dimensioned so that the maximum excess pressure will never rise above 6 bar.

Note! It is recommended not to use mix with strawberry seeds or similar grinding particles that may damage the air/mix pump and the freezing barrel.

WARNING

Make sure that the machine and its installations are in accordance with local regulations and safety demands before it is taken into service. Immediately notify Tetra Pak Hoyer of any fault or irregularity.

1.7 Connection to electrical installations

The freezer has been factory tested for the voltage and frequency specified in the type plate which is located on the high-voltage cabinet.

An authorized electrician must connect the freezer to the mains. This part of the installation process always takes place at the customer’s own risk unless otherwise agreed in the contract.

1) Connect the freezer to the factory’s high-voltage mains by means of an approved cable.
2) Make sure that the voltage and frequencies of the factory’s mains and the freezer’s type plate are compatible.
3) Switch on the freezer’s main switch, motor guard, and fuses (placed in the high-voltage cabinet).
4) Check that the direction of rotation of the dasher motor and the air/mix pump motor corresponds with the direction of the arrows.
5) Switch on the power to the ice cream freezer for minimum 6 hours before starting the refrigerating compressor.
6) The refrigerating compressor is equipped with an oil heater that removes the freon from the oil.

2 Maintenance

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2.1 Preventive maintenance

This freezer has been designed so that it needs a minimum of maintenance.

Wherever possible, lifetime lubricated bearings have been used in order to minimize day-to-day maintenance.

2.1.1 Operation period

Daily:

- Cleaning according to the instructions under “Daily cleaning”.

Every three months:

- All interior, movable parts in the mix balance tank, pump and freezing barrel and pressure control valve must be disassembled and manually cleaned to remove any calcium deposits from the flushing water.
- Lubricate all joints and unions with a suitable vegetable oil in connection with assembly.
- The top bearing of the pump connecting rod, must be lubricated with SKF: LGEM2 or a similar bearing grease.
- Check the compressor’s oil level.

2.1.2 Outside the operation period

After a period of a month or longer without production, check the following:

- Check all functions - both mechanical and electric.
- Lubricate the top glide bearing of the connecting rod.
- Check the oil level of the compressor.

2.2 Mechanical Overhaul

- Inspect the dasher drive shaft. If the drive shaft is noisy during operation, dismantle it and change bearings and O-rings.
- Inspect the rotating shaft seal. The two gliding surfaces must always be mirror finished; otherwise the mix will escape. Replace the carbon ring if worn; press the new carbon ring into place with the pressure evenly distributed around its entire circumference as it will otherwise easily break or become damaged.
- Inspect the belts to the drive shaft; the belts must be evenly stretched. Replace all belts at the same time, and ensure that all belts are identical.
- Inspect the systems, and call for repair service if repairs are needed.

3 Spare Parts Catalogue

3.0 Information about spare parts

3.0.1 General

During the lifetime of this Hoyer ice cream equipment the plant will require spare parts, service and maintenance in order to maintain its high performance.

Using genuine Hoyer spare parts from Tetra Pak guaranties the reliable, efficient and safe operation of the Hoyer ice cream equipment.

All generic parts are in stock ready for immediate delivery. Special parts not in stock will be manufactured in our own workshops based on original documentation and all parts are covered by a one-year guarantee. Genuine Hoyer spare parts from Tetra Pak save you money by increasing uptime and avoiding damage due to inferior quality of non-original parts.

Tetra Pak Technical Sales and Service is equipped to give the ultimate help and service to secure a correct and expedient handling of spare parts orders.

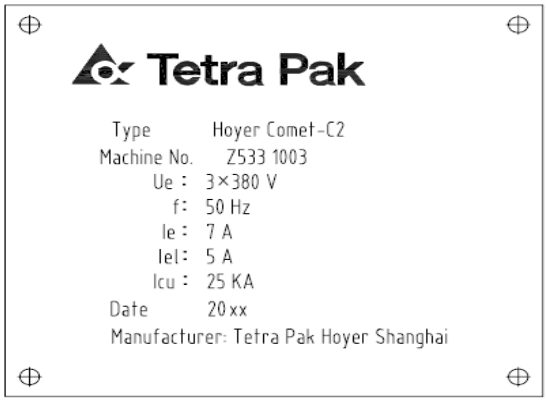
The global supply chain network secure fast and traceable handling of shipments throughout the world.

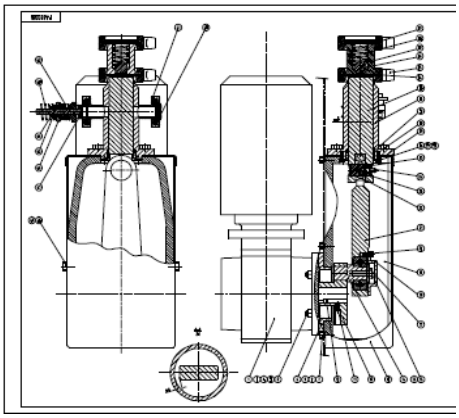
3.0.2 How to order spare parts

In order to deliver the correct parts there are 4 critical points of information, which enable the delivery of the right parts

- **Customer name and plant**
- **Machine type and number (Zxxx xxxx)**
- **Description of spare part**
- **Spare part number**

The type and serial number is always found on the machine identification plate.





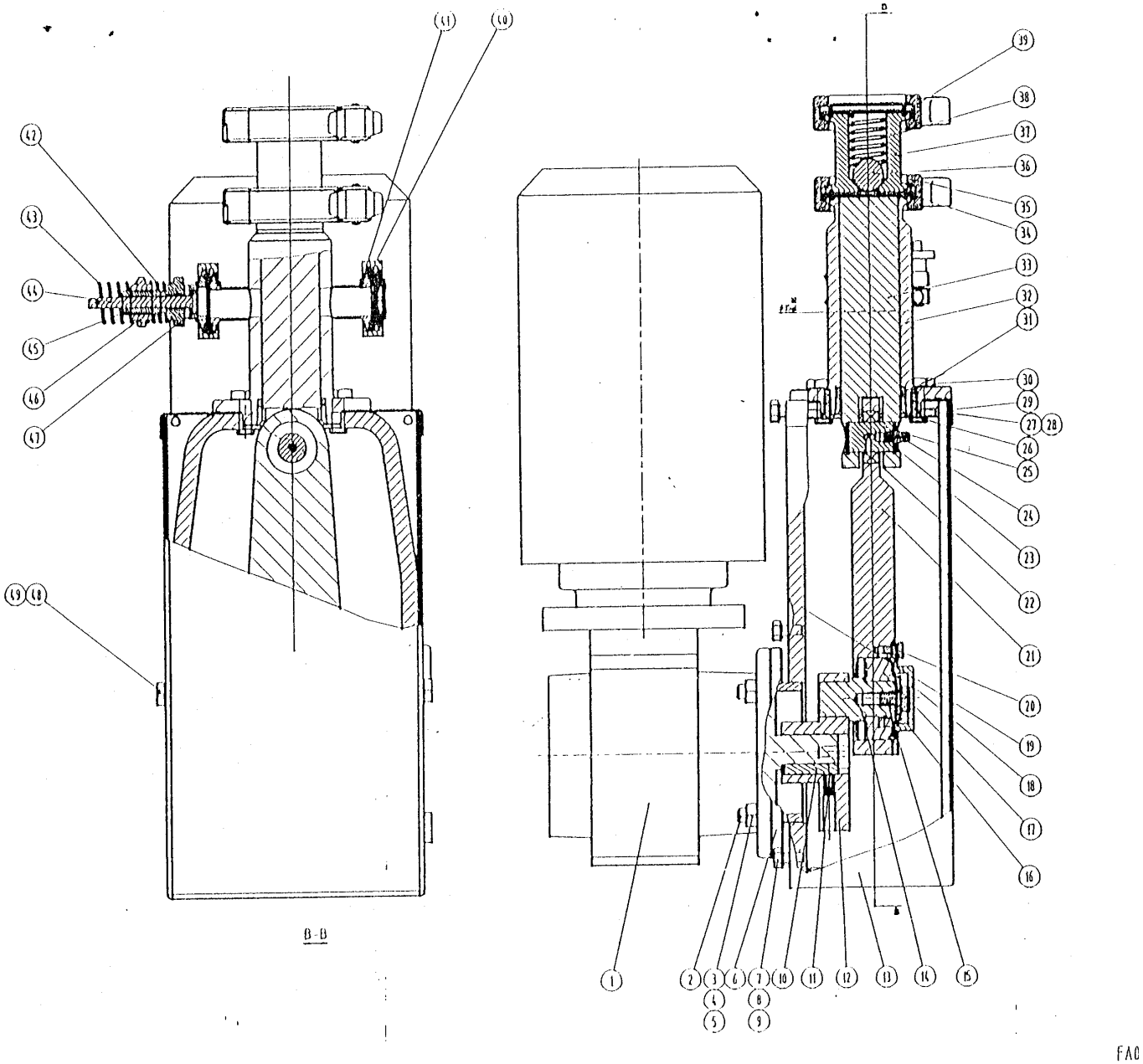
If you want to know more about Hoyer spare parts from Tetra Pak - or about any other service products - contact your nearest Tetra Pak Service representative.

3.1 Pump 1-2

3.1.1 Bom No. 50101102

POS.	PART NO.	QTY	UNIT	DESCRIPTION
1	30304005	1	pcs	gear & motor
2	10602062	4	pcs	bolt M8 x 40
3	10601014	4	pcs	nut M8
4	10603021	4	pcs	washer 8
5	10604003	4	pcs	spring washer 8
6	30201051	1	pcs	collar
7	10602047	6	pcs	bolt M6 x 12
8	10603023	6	pcs	washer 6
9	10604002	6	pcs	spring washer 6
10	10607002	1	pcs	feather key 6 x 6 x 32
11	10602048	1	pcs	allen screw M6 x 12
12	30201054	1	pcs	pump crank
13	30101019	1	pcs	pump guard part II
14	30201055	1	pcs	pump crank shaft
15	10602054	1	pcs	bolt
16	30201061	1	pcs	pump washer
17	30901097	1	pcs	ball bearing
18	30201052	1	pcs	pump cap
19	30201053	1	pcs	pump console
20	10602045	3	pcs	bolt
21	30201057	1	pcs	pump piston rod
22	30901003	1	pcs	friction bearing
23	10605001	2	pcs	lock ring

Pos.	Part No.	Qty	Unit	Description
24	30909001	1	pcs	M6 grease nipple
25	30201056	1	pcs	pump pin
26	30201106	1	pcs	back ring
27	10602030	2	pcs	bolt M4 x 12
28	10604001	2	pcs	spring washer 4
29	30101018	1	pcs	pump guard part I
30	10602057	4	pcs	bolt M8 x 20
31	30903027	1	pcs	pump gasket
32	30201050	1	pcs	pump housing with clamp
33	30201058	1	pcs	pump plunger
34	30903070	1	pcs	1 1/2" seal ring
35	31003004	2	pcs	clamp ring 25/38 mm
36	30901016	1	pcs	pump valve ball
37	30201059	1	pcs	pump valve part I
38	30909008	1	pcs	pump valve spring
39	30903069	1	pcs	1" seal ring
40	30903047	2	pcs	ß¹16 seal ring
41	31003003	2	pcs	clamp ring ß¹10/ß¹20
42	30909006	1	pcs	air valve spring 2
43	30909005	1	pcs	air valve spring 1
44	30201015	1	pcs	air valve piston
45	30201014	1	pcs	air valve housing
46	30201013	1	pcs	air valve adjuster
47	30903015	1	pcs	o-ring ß¹9.6/ß¹2.4
48	10602053	2	pcs	bolt M8 x 12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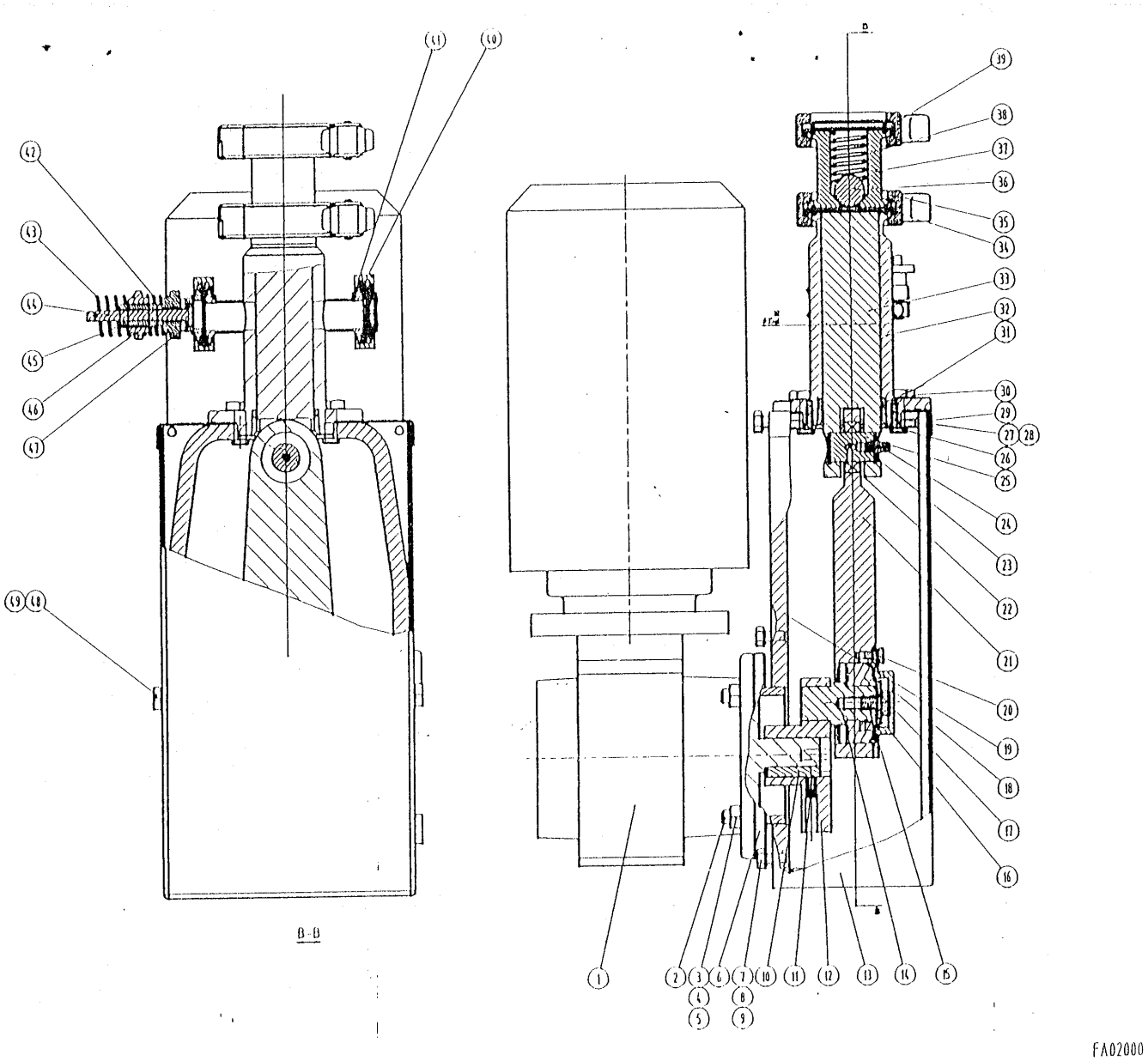
POS.	PART NO.	QTY	UNIT	DESCRIPTION
49	10603021	2	pcs	washer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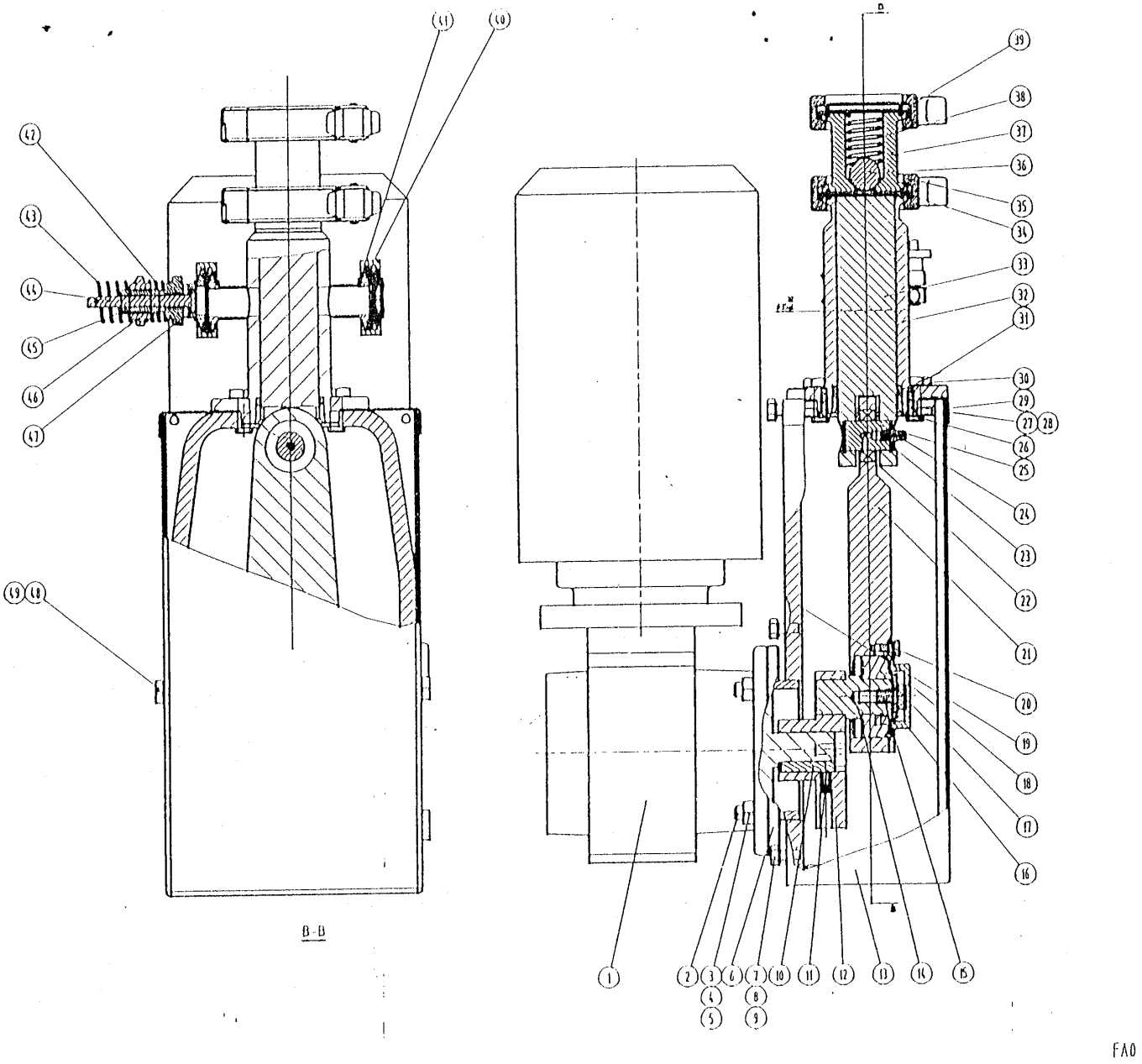
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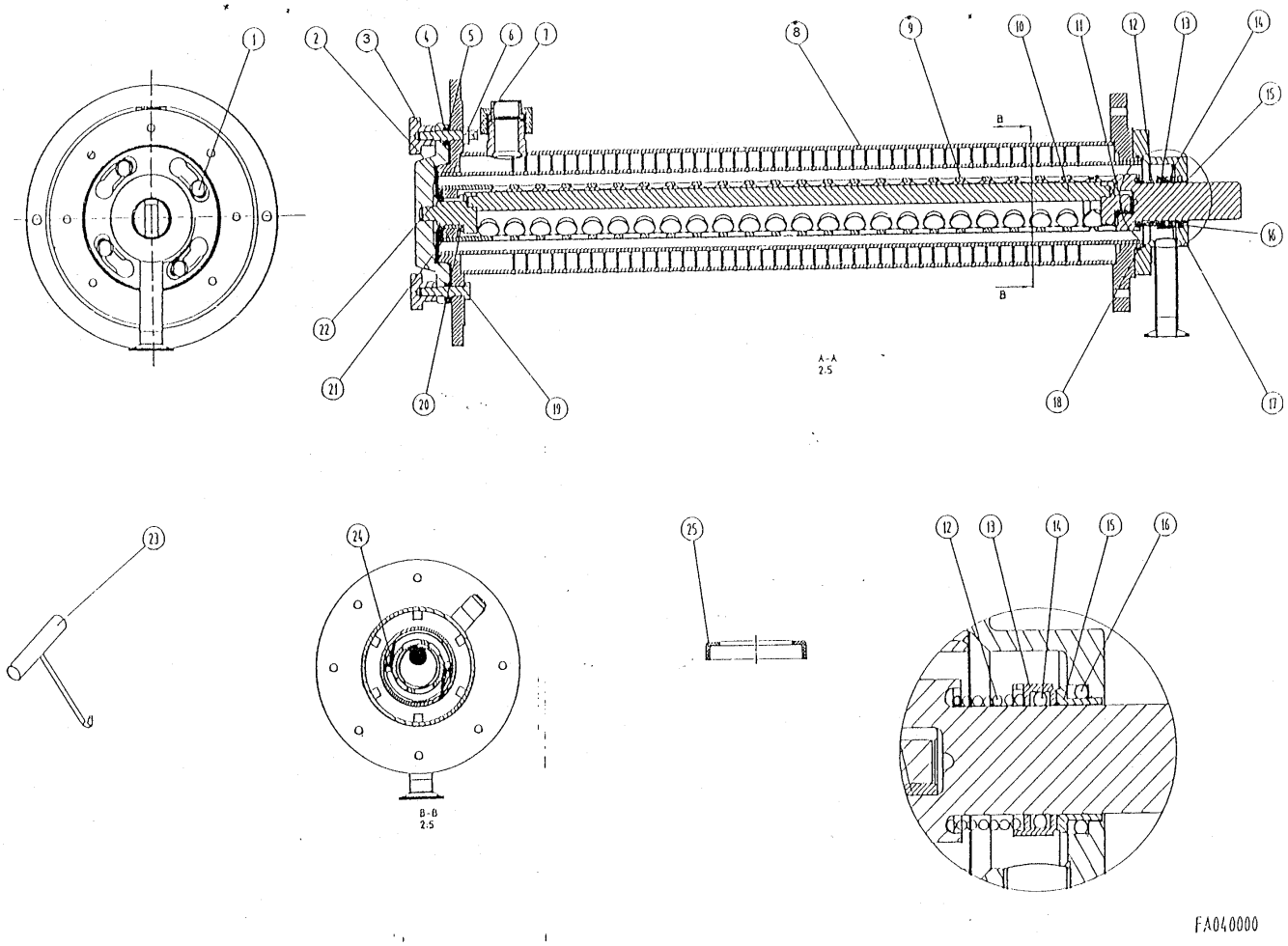
3.2 Cylinder Assembly

3.2.1 Bom No. 50101104

Pos.	Part No.	Qty	Unit	Description
1	30201078	4	pcs	thread key
2	30201085	1	pcs	gasket
3	30201036	2	pcs	knurled nut
4	30201137	1	pcs	top cover
5	10601002	2	pcs	M10 nut
6	10602424	1	pcs	M10x55 bolt
7	10601001	3	pcs	M10 nut
8	30302001	1	pcs	cylinder
9	30201062	1	pcs	dasher
10	30201127	1	pcs	whipper
11	59609120421	1	pcs	bush ß¹16/ß¹25
12	30909010	1	pcs	shaft seal spring
13	30903017	1	pcs	shaft seal rotating
14	30903009	1	pcs	o-ring
15	30903018	1	pcs	shaft seal stationary
16	30903010	1	pcs	o-ring
17	50101006	1	pcs	base cover
18	30903016	1	pcs	o-ring
19	10602008	3	pcs	bolt M10 x 45
20	59609120422	1	pcs	bush ß¹25/ß¹33
21	30201124	1	pcs	bush ß¹33/ß¹52
22	10605018	1	pcs	lock ring ß¹60
23	30101091	1	pcs	hook

POS.	PART NO.	QTY	UNIT	DESCRIPTION
24	59609120423	2	pcs	blade
25	30201031	1	pcs	mounting tool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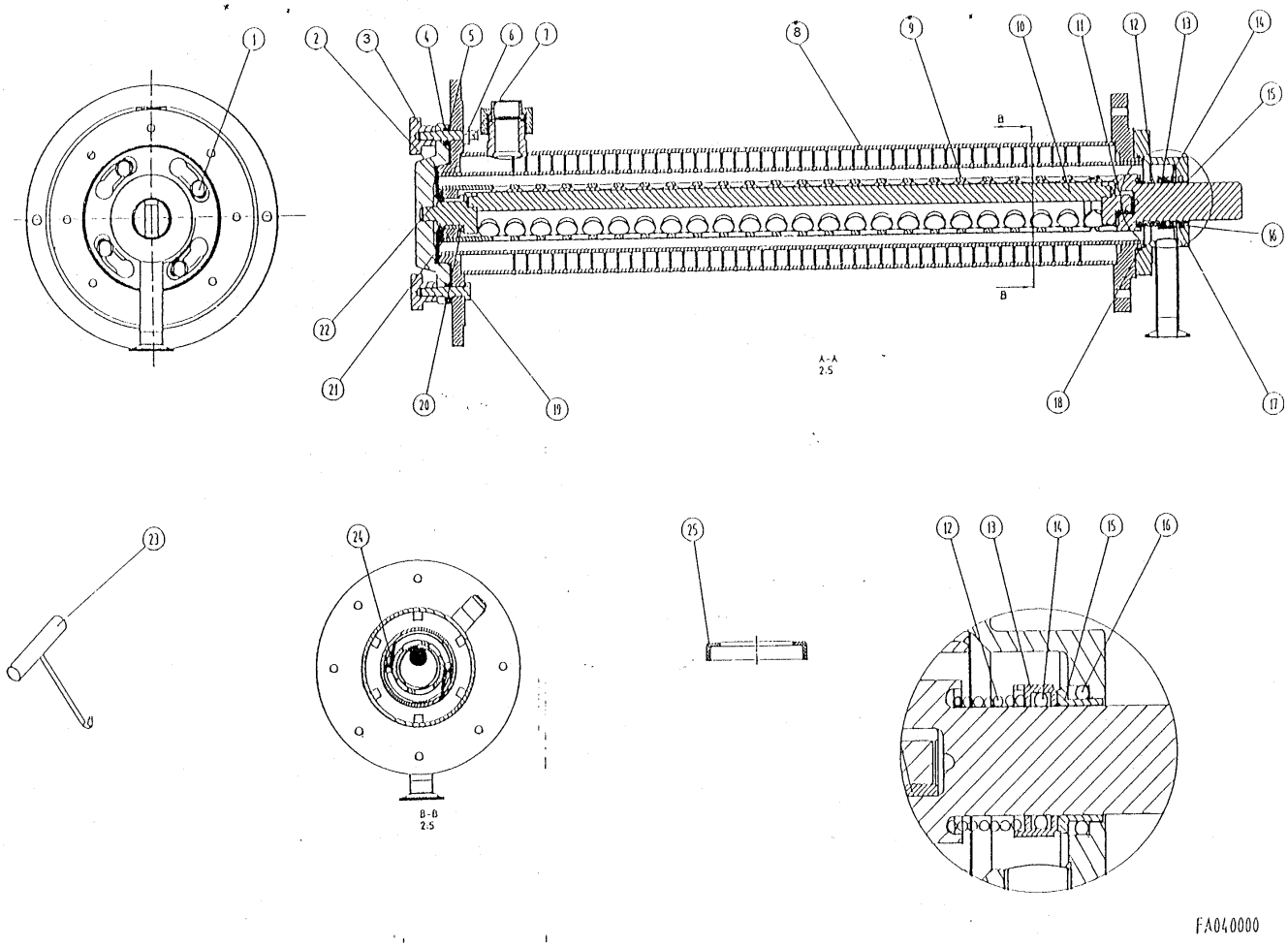
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3.3 Pressure regulating valve

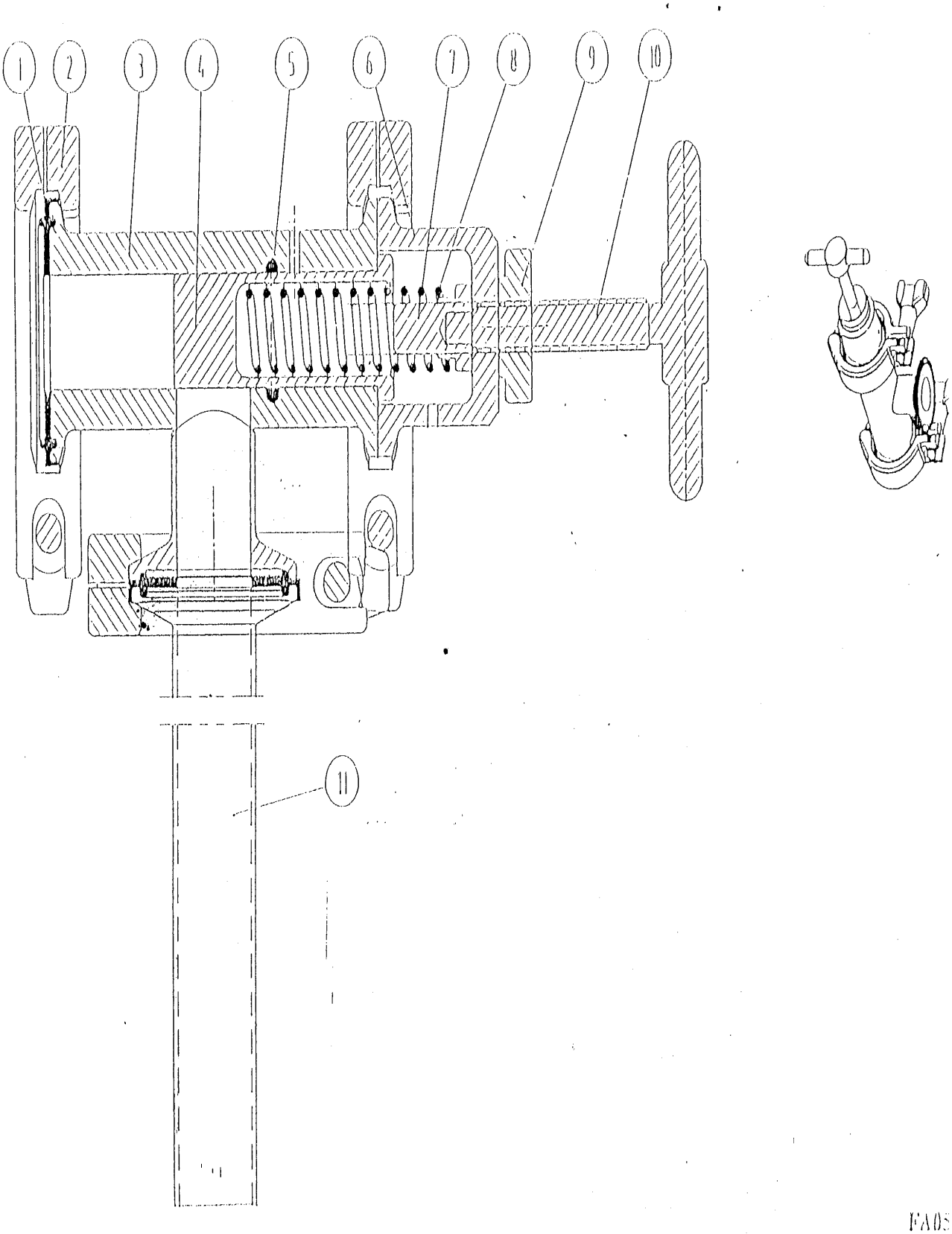
3.3.1 Bom No. 50101105

POS.	PART NO.	QTY	UNIT	DESCRIPTION
1	30903069	2	pcs	1" seal ring
2	31003004	3	pcs	clamp ring
3	30201018	1	pcs	housing
4	30201019	1	pcs	piston
5	30903007	1	pcs	o-ring 22.5x3
6	30201016	1	pcs	cover
7	30201020	1	pcs	guide
8	30909007	1	pcs	spring
9	30201037	1	pcs	knurled nut
10	30201017	1	pcs	hand grip
11	50101044	1	pcs	polished tube

3.4 Mix Tank

3.4.1 Bom No. 50101106

POS.	PART NO.	QTY	UNIT	DESCRIPTION
1	30309001	1	pcs	mix tank box
2	30309001	1	pcs	mix tank cover
3	59609180621	1	pcs	float
4	30909011	1	pcs	lock pin
5	30201094	1	pcs	valve seat
6	31003004	3	pcs	clamp liner-welding
7	30903070	2	pcs	1 1/2" seal ring
8	30201079	1	pcs	inlet pipe
9	30903057	1	pcs	o-ring 9.12x3.53
10	30903069	1	pcs	1" seal ring
11	30201092	4	pcs	gasket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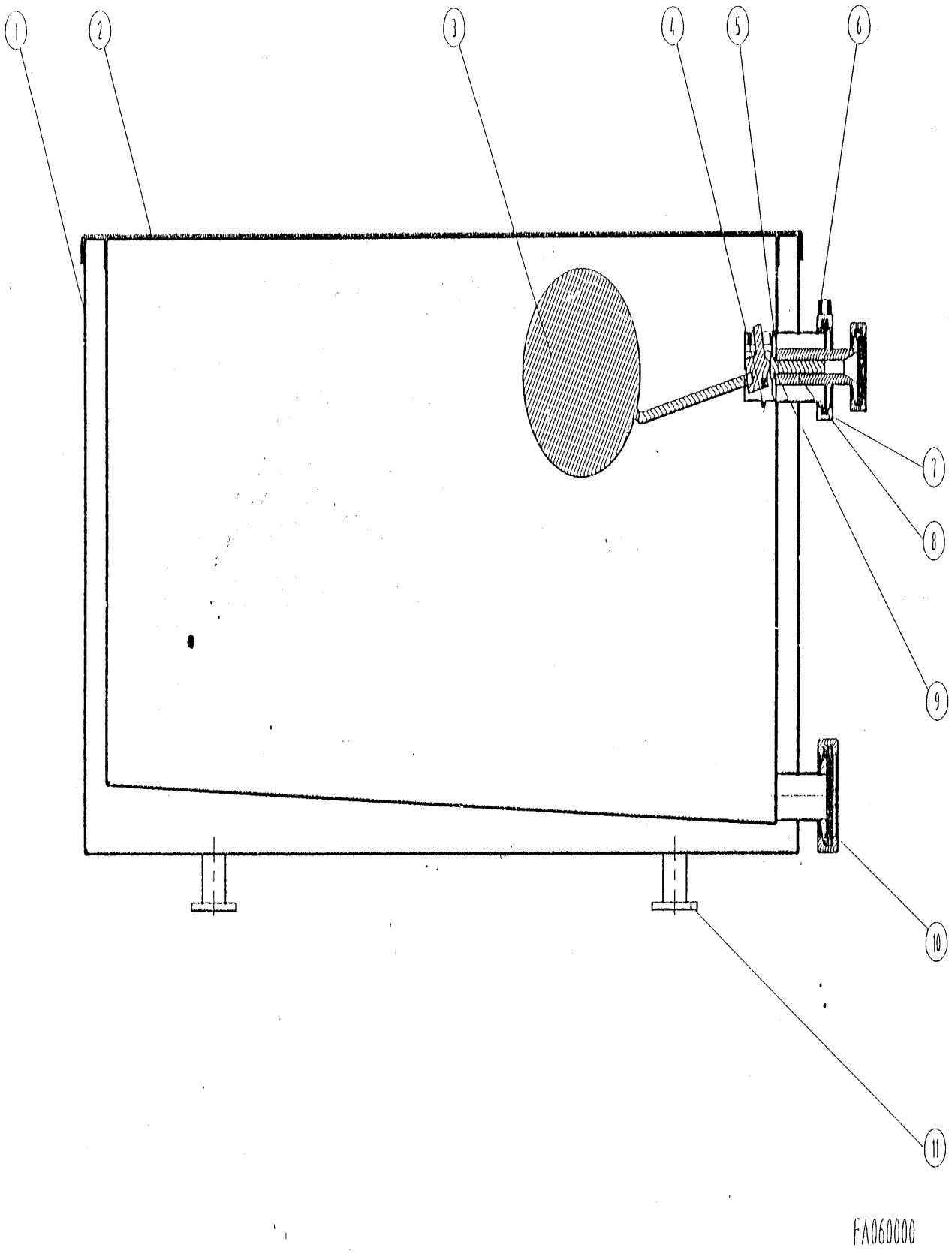
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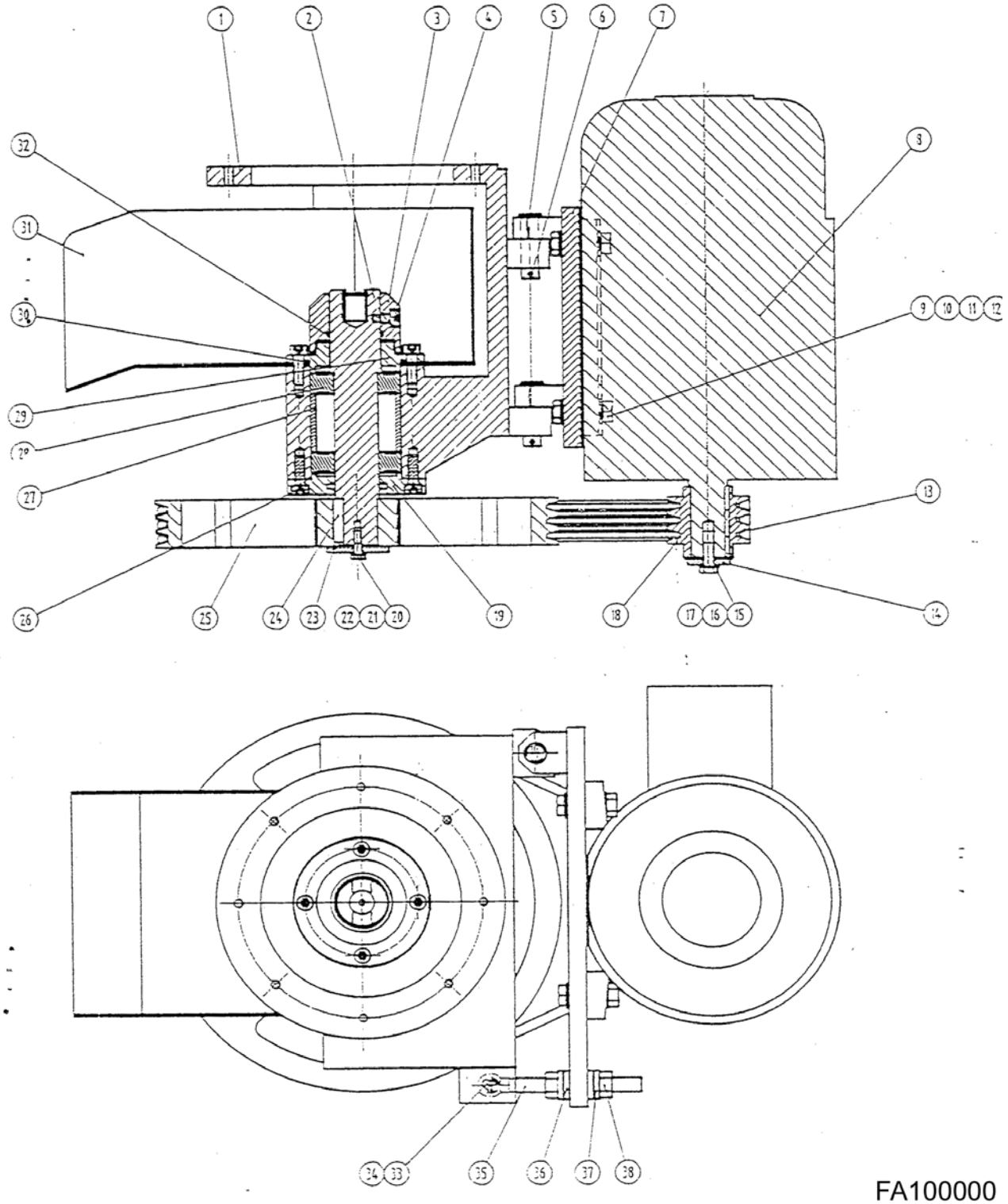
3.5 Main Motor Assembly

3.5.1 Bom No.50101110

POS.	PART NO.	QTY	UNIT	DESCRIPTION
1	30201063	1	pcs	Main motor console
2	30201003	1	pcs	Shaft for rotor
3	30201001	1	pcs	Claw around the main shaft
4	30201033	1	pcs	Machine the Scew
5	30201047	2	pcs	Machine the pin
6	10608003	2	pcs	Spilt pin
7	30201064	1	pcs	Plate for main motor
8	30303001	1	pcs	Motor
9	10602016	4	pcs	Balt M12*45
10	10601003	4	pcs	Nut M12
11	10604005	4	pcs	Spring washer 12
12	10603005	4	pcs	Washer 12
13	30904001	3	pcs	V-Belt
14	30201040	1	pcs	Spacer
15	10602004	1	pcs	Bolt M10*25
16	10603002	1	pcs	Washer 10
17	10604004	1	pcs	Spring Washer 10
18	30906002	1	pcs	Small pulley
19	30201071	1	pcs	Cover plate
20	10602050	1	pcs	Bolt M6*20
21	10603016	1	pcs	Washer 6
22	10604002	1	pcs	Spring washer 6
23	30201039	1	pcs	Spacer

POS.	PART NO.	QTY	UNIT	DESCRIPTION
24	10607001	1	pcs	Feather Key 10*8*40
25	30906001	1	pcs	Pulley for V-Belt 315
26	10602058	8	pcs	Bolt M8*20
27	30201038	1	pcs	Distance ring
28	30901001	2	pcs	Bearing
29	30201070	1	pcs	Cover plate
30	30903023	1	pcs	O-Ring
31	30101021	1	pcs	Drip tray cylinder
32	30902038	1	pcs	O-Ring
33	30201046	1	pcs	Machine the pin
34	10608027	1	pcs	Spilt pin
35	30201035	1	pcs	Bolt
36	30201042	2	pcs	Washer
37	30201041	2	pcs	Washer
38	10601003	2	pcs	Nut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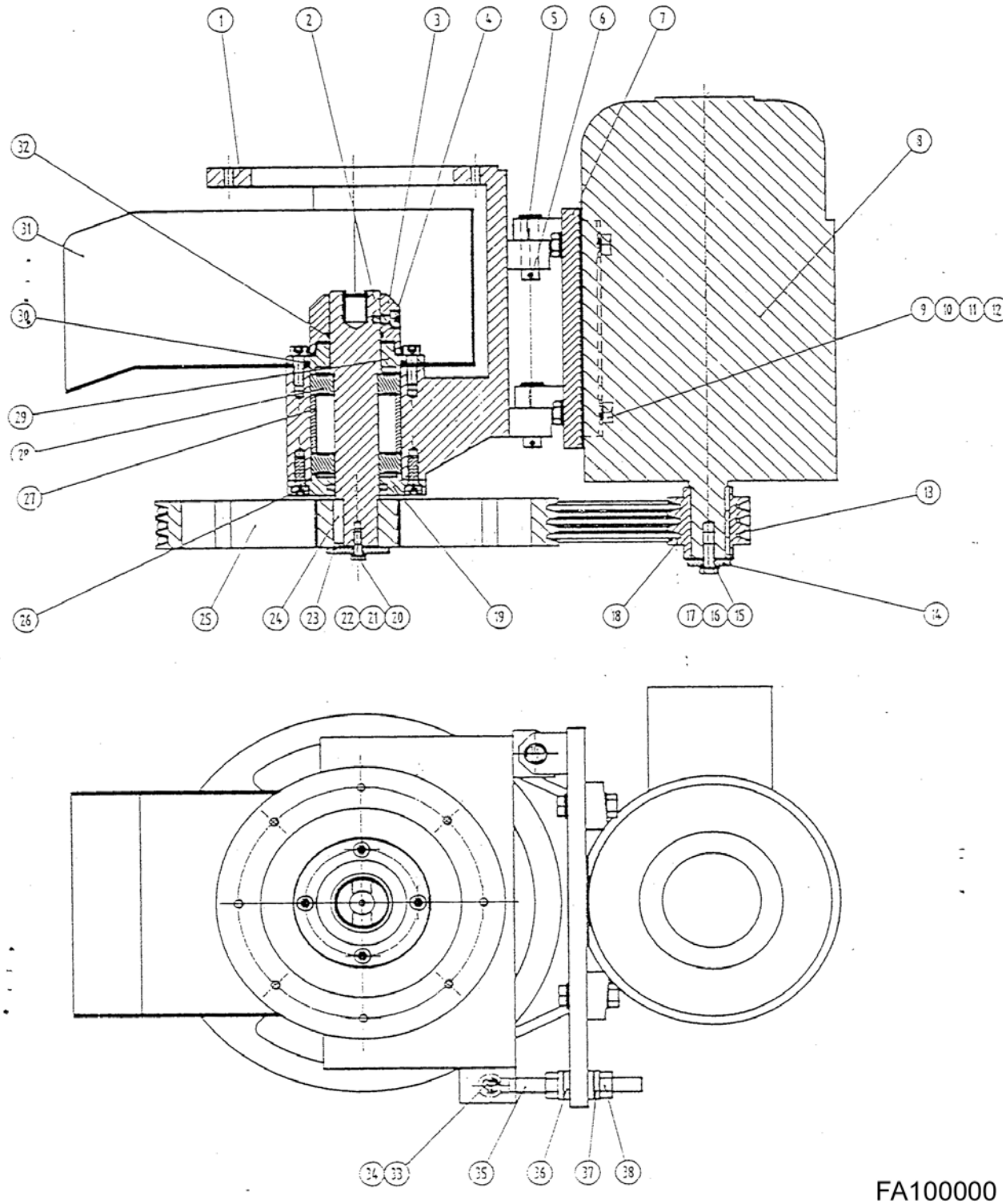
3.6 Cooling System

3.6.1 Bom No. 50101113

POS.	PART NO.	QTY	UNIT	DESCRIPTION
1	10602018	4	pcs	bolt M12*55
2	10603005	4	pcs	washer
3	10604005	4	pcs	Spring washer 12
4	10601003	4	pcs	nut M12
5	10404002	4	pcs	asbestos washer
6	10609002	12	pcs	1/4 forged nut
7	10303004	1	pcs	16 copper pipe 1/4
8	10303002	1	pcs	2 copper pipe 1/2
9	30302002	1	pcs	condenser
10	30201044	4	pcs	sailent washer for compressor
11	30201045	4	pcs	washer for compressor
12	10602019	4	pcs	bolt M12*65
13	10604005	4	pcs	Spring washer 12
14	10603005	4	pcs	washer 12
15	10601003	4	pcs	nut M12
16	10609001	3	pcs	1/2 flared nut
17	30501026	1	pcs	drier filter
18	30101022	1	pcs	support for drier filter
19	30101025	1	pcs	clamp for drier filter
20	10401001	1	pcs	U shaped rubber cover
21	10602045	4	pcs	bolt M5*8
22	59609121101	1	pcs	Connection 2
23	30501011	1	pcs	slight glasses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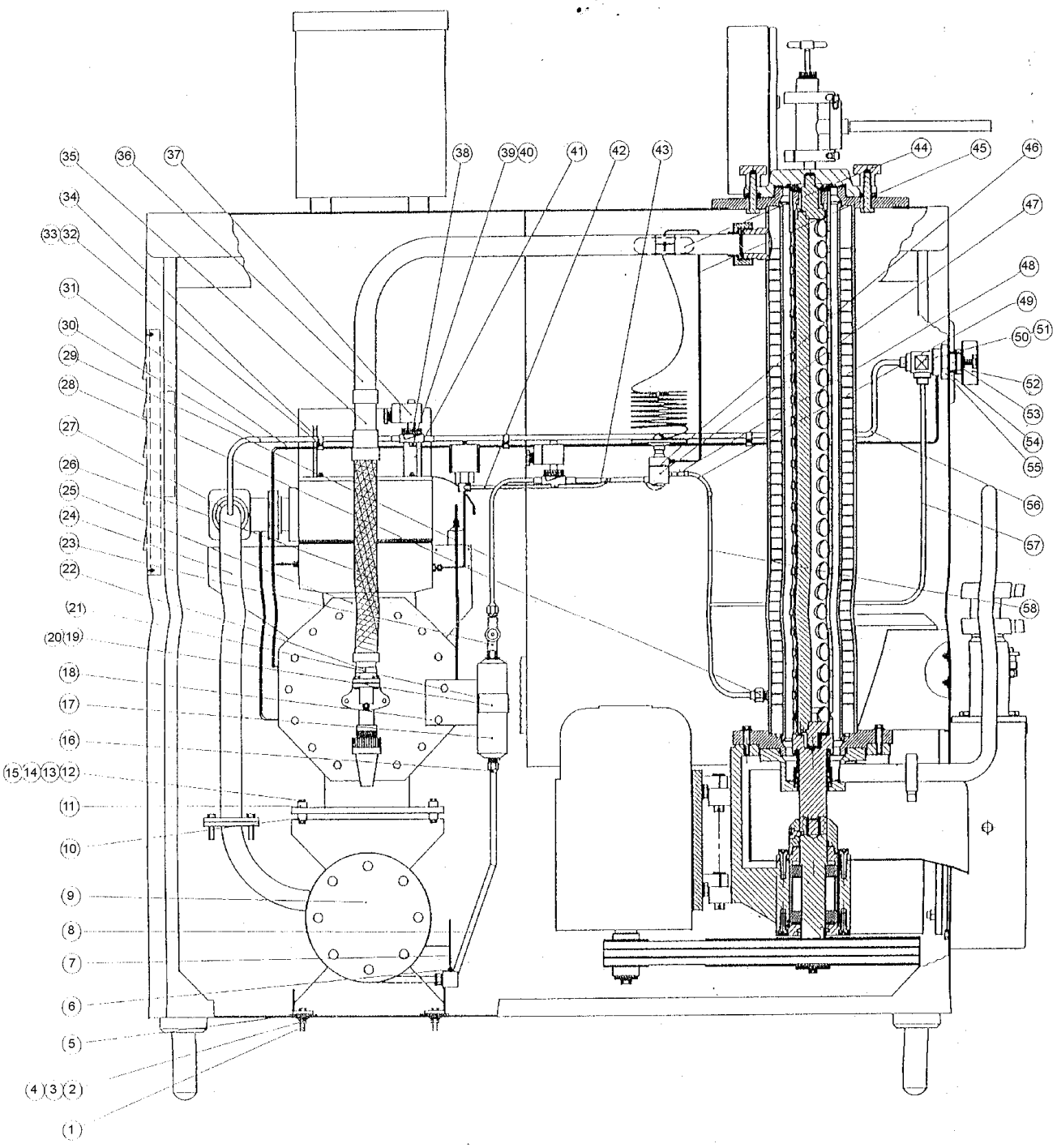
POS.	PART NO.	QTY	UNIT	DESCRIPTION
24	10303005	1	pcs	1 copper pipe 7/8
25	30308028	1	pcs	R22 discus compressor
26	30501013	1	pcs	vibration absorber
27	30201012	1	pcs	connection 1
28	10609003	1	pcs	5/8 flared nut
29	10303002	1	pcs	3 copper pipe 1/2
30	10303002	1	pcs	13 copper pipe 1/2
31	10303004	1	pcs	11 copper pipe 1/4
32	10602039	5	pcs	bolt M4*8
33	10601010	5	pcs	nut M4
34	30101026	6	pcs	clamp
35	10609007	1	pcs	45 elbow in/out
36	10303006	1	pcs	12 copper pipe 7/8
37	30404001	2	pcs	coil for solenoid valve
38	30501003	2	pcs	washer for compressor
39	10602041	1	pcs	bolt M5*25
40	10603015	1	pcs	washer 5
41	30101023	1	pcs	5 copper pipe 1/4
42	10303004	1	pcs	4 copper pipe 1/2
43	10303002	1	pcs	1/2 flared nut
44	30501026	1	pcs	thermostatic element
45	50101029	1	pcs	6 capillary tube
46	30501027	1	pcs	orifice assembly
47	30501004	1	pcs	valve body
48	10303003	1	pcs	20 copper pipe 5/8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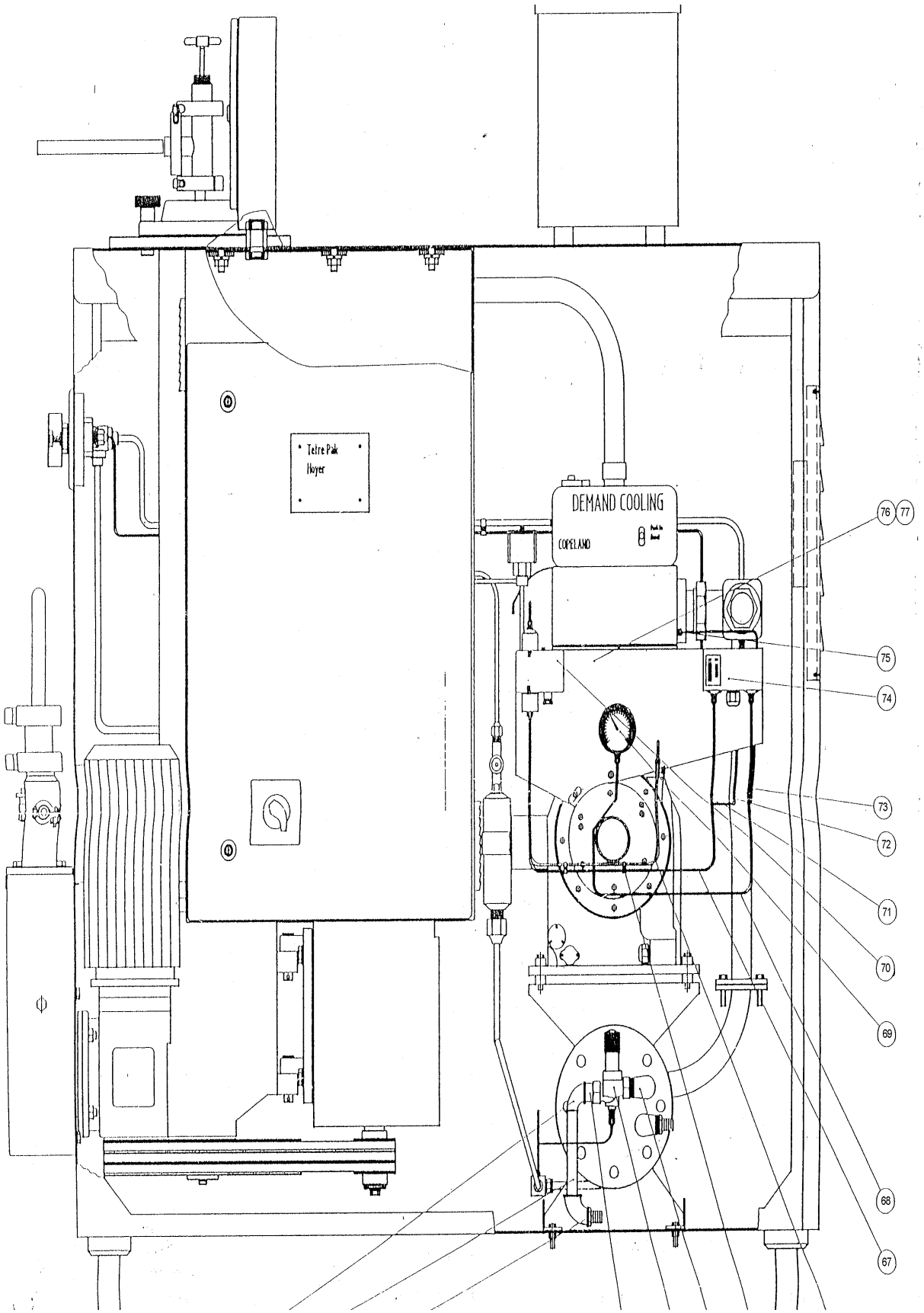
POS.	PART NO.	QTY	UNIT	DESCRIPTION
49	10609009	1	pcs	90 elbow out/outside
50	30503001	1	pcs	regulating valve
51	30201089	1	pcs	bolt M4*12
52	30201087	1	pcs	handle for hot gas valve
53	10601012	1	pcs	special nut
54	30602021	1	pcs	pressure gauge
55	10601008	1	pcs	nut M22^1.5/10
56	10303002	1	pcs	10 copper pipe 1/2
57	10303002	1	pcs	9 copper pipe 1/2
58	10303003	1	pcs	8 copper pipe 1/2
59	31101004	1	pcs	elbow 3/4 90
60		1	pcs	3/4*100 water pipe
61	30201082	2	pcs	hose connector
62	31101002	2	pcs	3/4^50 nipple
63	30501001	1	pcs	water regulating valve
64	31101003	1	pcs	3/4 elbow in/outside
65	30101027	4	pcs	clamp
66	10303004	1	pcs	15 copper pipe 1/4
67	10303004	1	pcs	14 copper pipe 1/4
68	10303004	1	pcs	17 copper pipe 1/4
69	30602020	1	pcs	manometer
70	30501009	1	pcs	pressure controller
71	10609019	3	pcs	1/4 Tee for welding
72	10303004	1	pcs	19 copper pipe 1/4
73	10303004	1	pcs	18 copper pipe 1/4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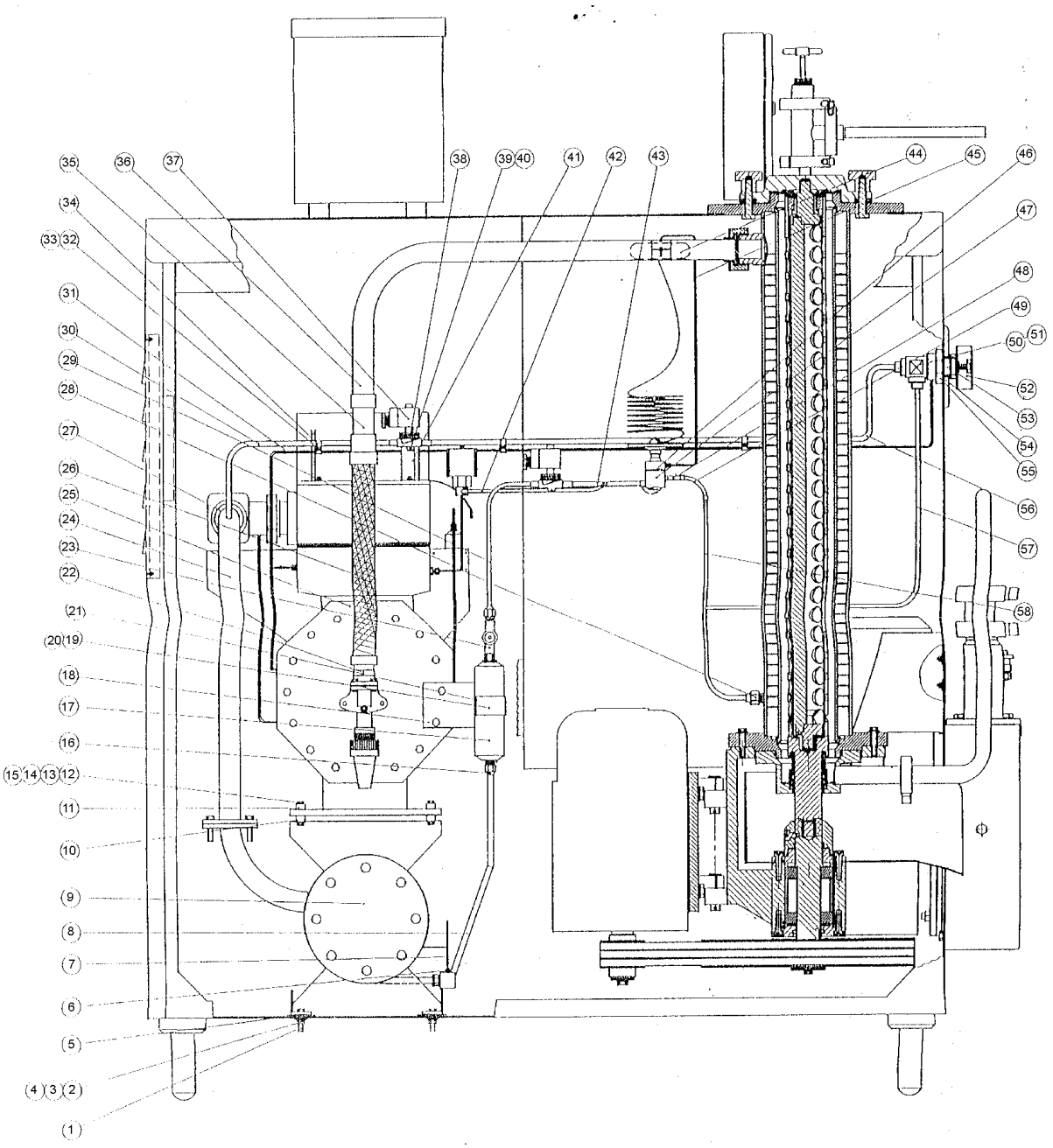
POS.	PART NO.	QTY	UNIT	DESCRIPTION
74	30501010	1	pcs	pressure controller
75	10609006	3	pcs	1/4 connector
76	30101024	1	pcs	support for meter
77	10602039	9	pcs	bolt M4*8
78	10405001		pcs	insulation board 13mm
79	10405002		pcs	insulation tube/1 1/8*3/8
80	10408003		pcs	insulation tube/5/8*3/8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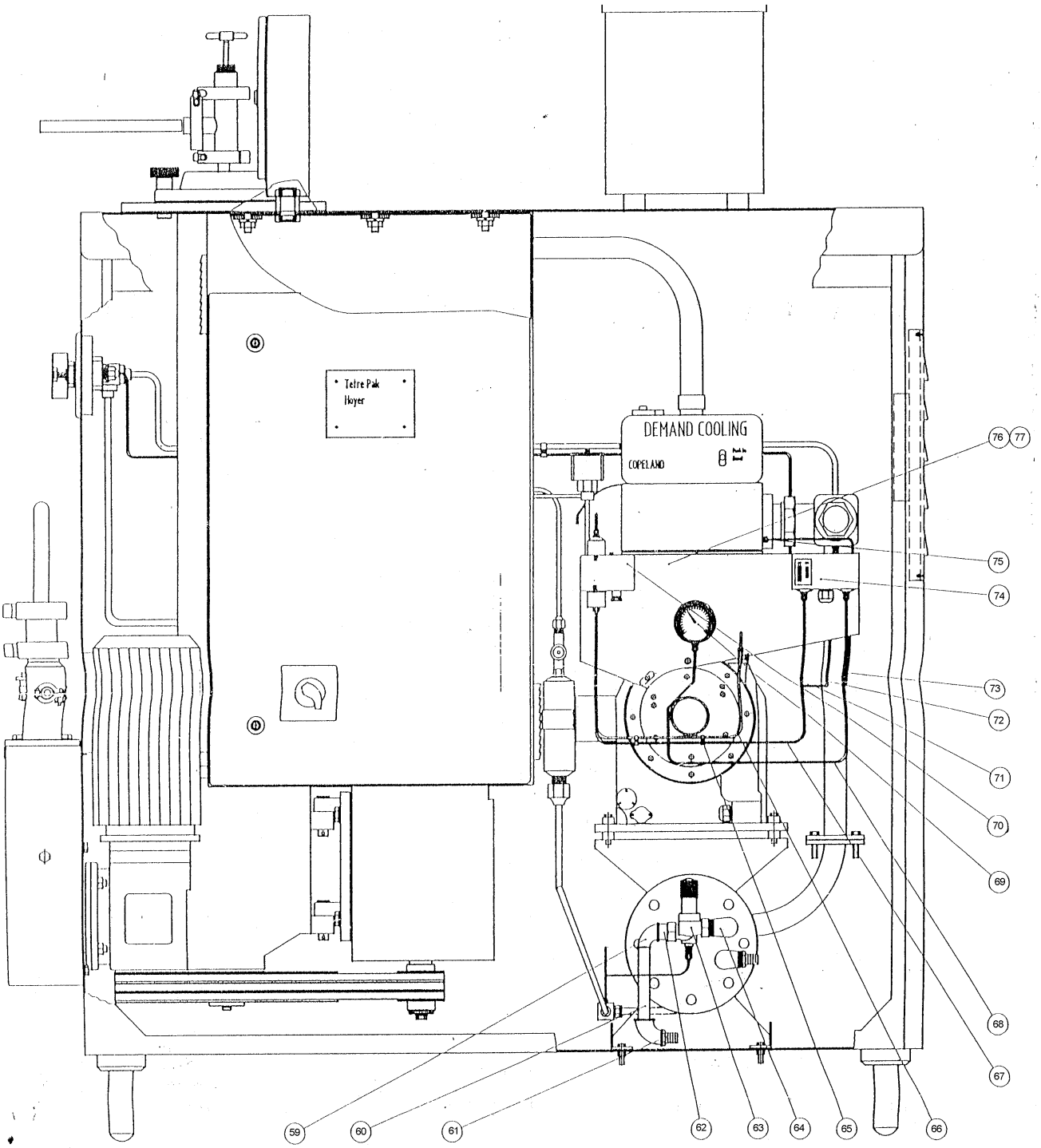
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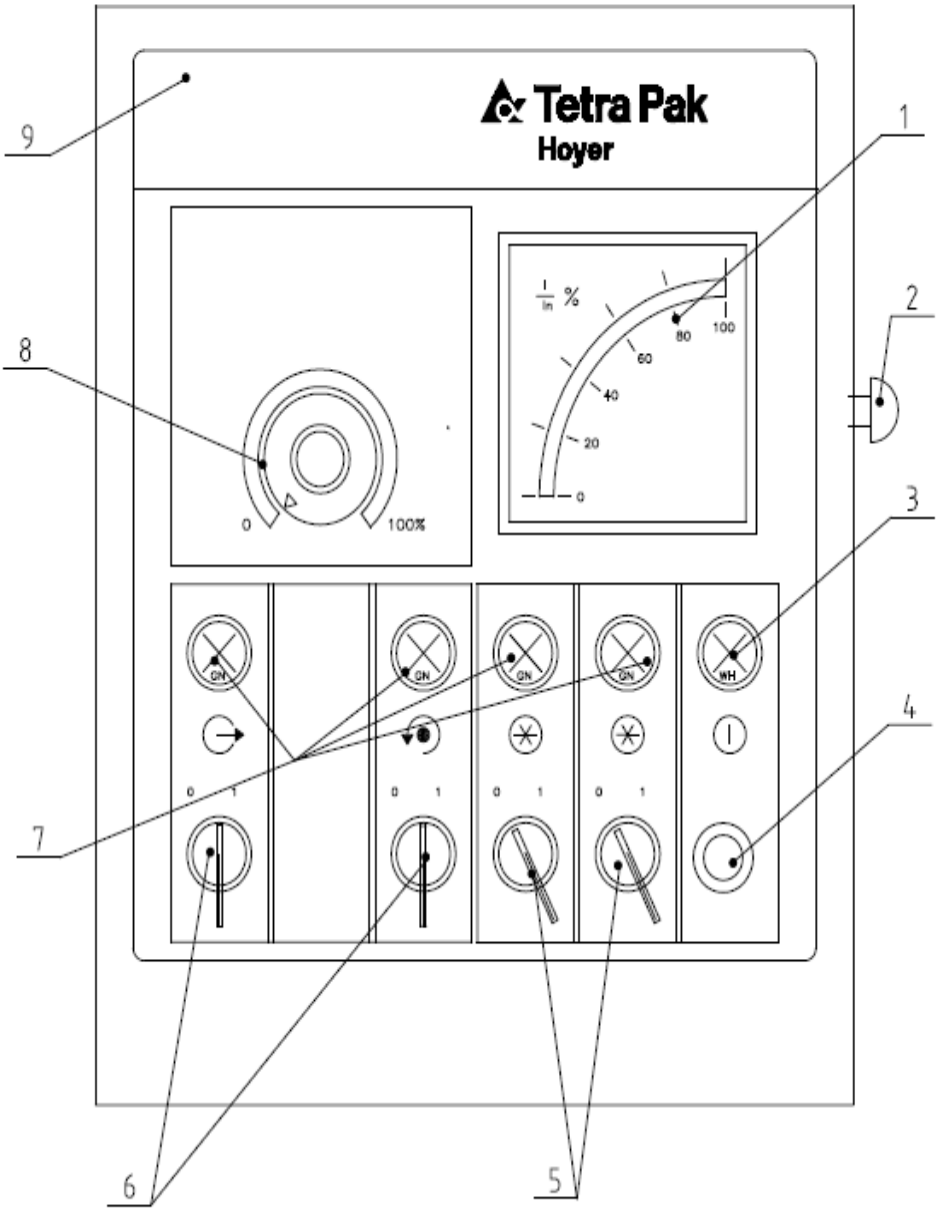
3.7 Control Panel

POS.	PART NO.	QTY	UNIT	DESCRIPTION
1	30601001	1	pcs	Current Meter
2	30402051	1	pcs	Indicator Light,White
	30402043	1	pcs	Lampholder
	30402002	1	pcs	Lamp
3	30402050	1	pcs	Mushroom Operating Head Red
	30402005	1	pcs	Circular Legend Plate,Yellow
	30401230	2	pcs	Contact Block 2NC
4	30402049	2	pcs	Booted Pushbutton Blue
	30402047	1	pcs	Contact Block 1NO
5	30402044	2	pcs	Selector Head O - I
	30402047	2	pcs	Contact Block 1NO
6	30402045	2	pcs	Selector Head I > O < I
	30401229	2	pcs	Contact Block 1NO+1NC
7	30402041	4	pcs	Indicator Light, Green
	30402043	4	pcs	Lampholder
	30402002	4	pcs	Lamp
8	30406058	1	pcs	Potentiometer
	30406002	1	pcs	Potentiometer Knob Cover
	30406003	1	pcs	Potentiometer Knob
	30406004	1	pcs	Potentiometer Knob Index
9	31301004	1	pcs	Pannel Overlay



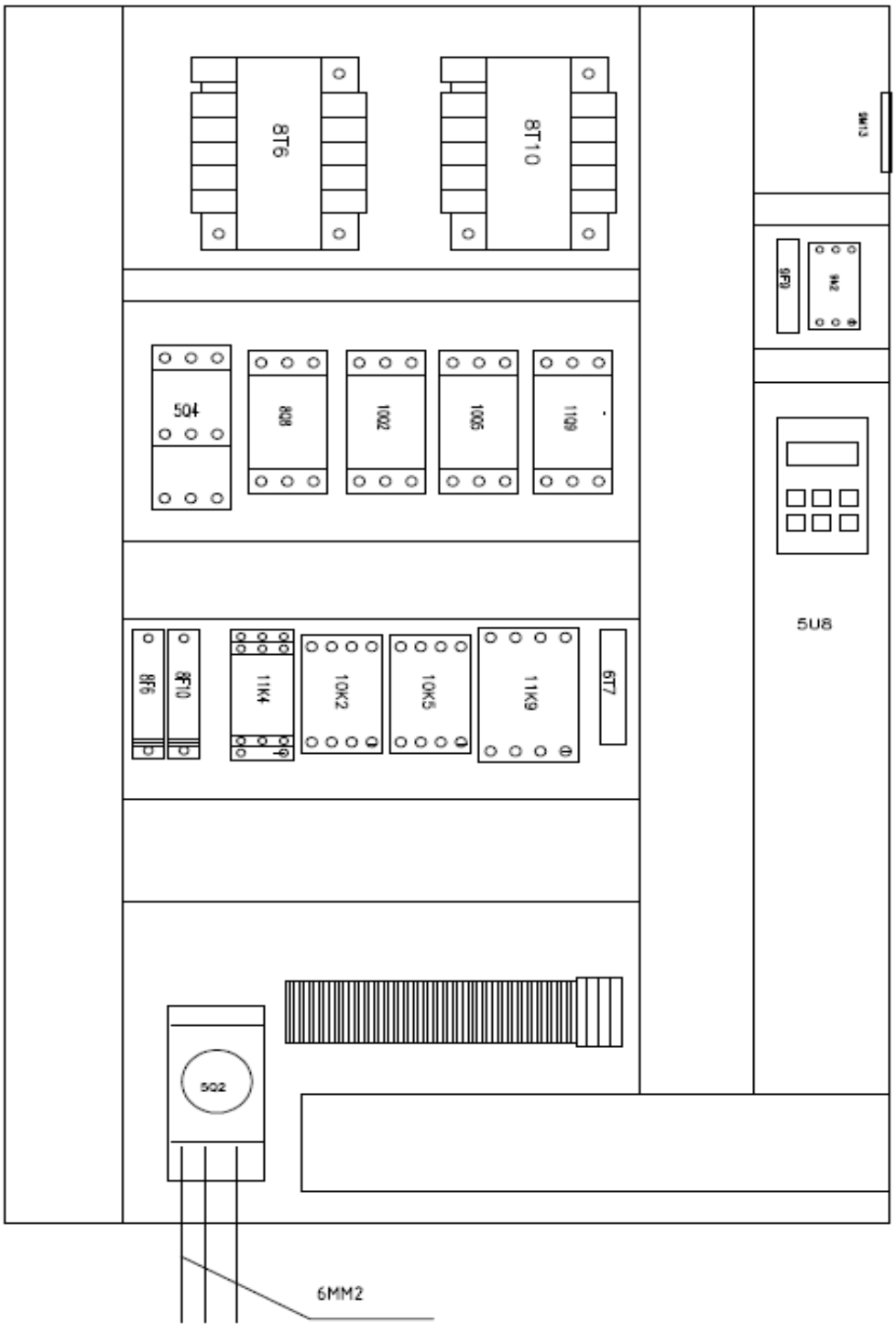
控制面板

CONTROL PANNEL

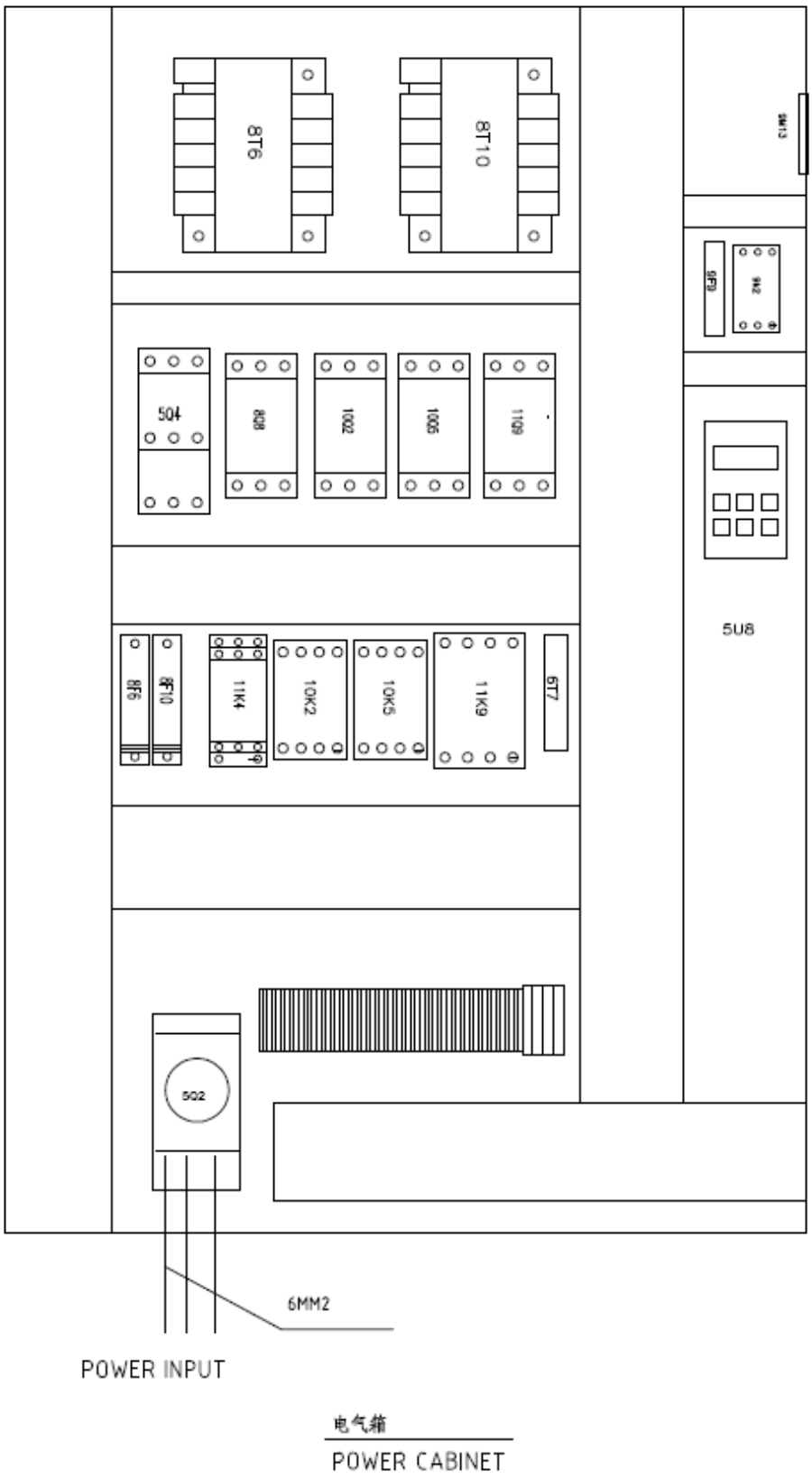
3.8 Power cabinet

POS.	PART NO.	QTY	UNIT	DESCRIPTION
8T6	30405004	1	pcs	Transformer 380V-->220V
8T10	30405003	1	pcs	Transformer 380V-->24V
9F9	30401208	1	pcs	Single Pole Circuit breaker
9K2	30403033	1	pcs	Safety Relay
5Q4	30403001	1	pcs	Terminal Block
	30403002	1	pcs	Current Limiter
	10803003	2	pcs	3-Pole 63A busbar
8Q8	30403175	2	pcs	Circuit breaker
10Q2	30403165	1	pcs	Circuit breaker
	30403166	2	pcs	Auxiliary contact block
10Q5	30403069	2	pcs	Circuit breaker
	30403166	2	pcs	Auxiliary contact block
11Q9	30401239	2	pcs	Circuit breaker
	30403166	4	pcs	Auxiliary contact block
5U8	30405024	4	pcs	VLT Converter
8F6	30401207	4	pcs	Single Pole Circuit breaker
8F10	30401217	1	pcs	Single Pole Circuit breaker
10K2	30403061	1	pcs	Main Contactor
10K5	30403061	1	pcs	Main Contactor
	30403049	1	pcs	Auxiliary contact block
11K9	30403016	1	pcs	Main Contactor
	30403172	4	pcs	Auxiliary contact block
6T7	30407001	1	pcs	Current Transformer
5Q2	30401006	1	pcs	Main Circuit Breaker

POS.	PART NO.	QTY	UNIT	DESCRIPTION
	30401001	1	pcs	Terminal Cover
	30401007	1	pcs	MCB Handle Accessories



电气箱
POWER CABINET


8T6
8T10
9M13
9F9
9K2
5O4
8Q8
10Q2
10Q5
11Q9
5U8
8F6
8F10
11K4
10K2
10K5
11K9
6T7
5Q2
6MM2
POWER INPUT
电气箱
POWER CABINET

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4 Electrical Documents

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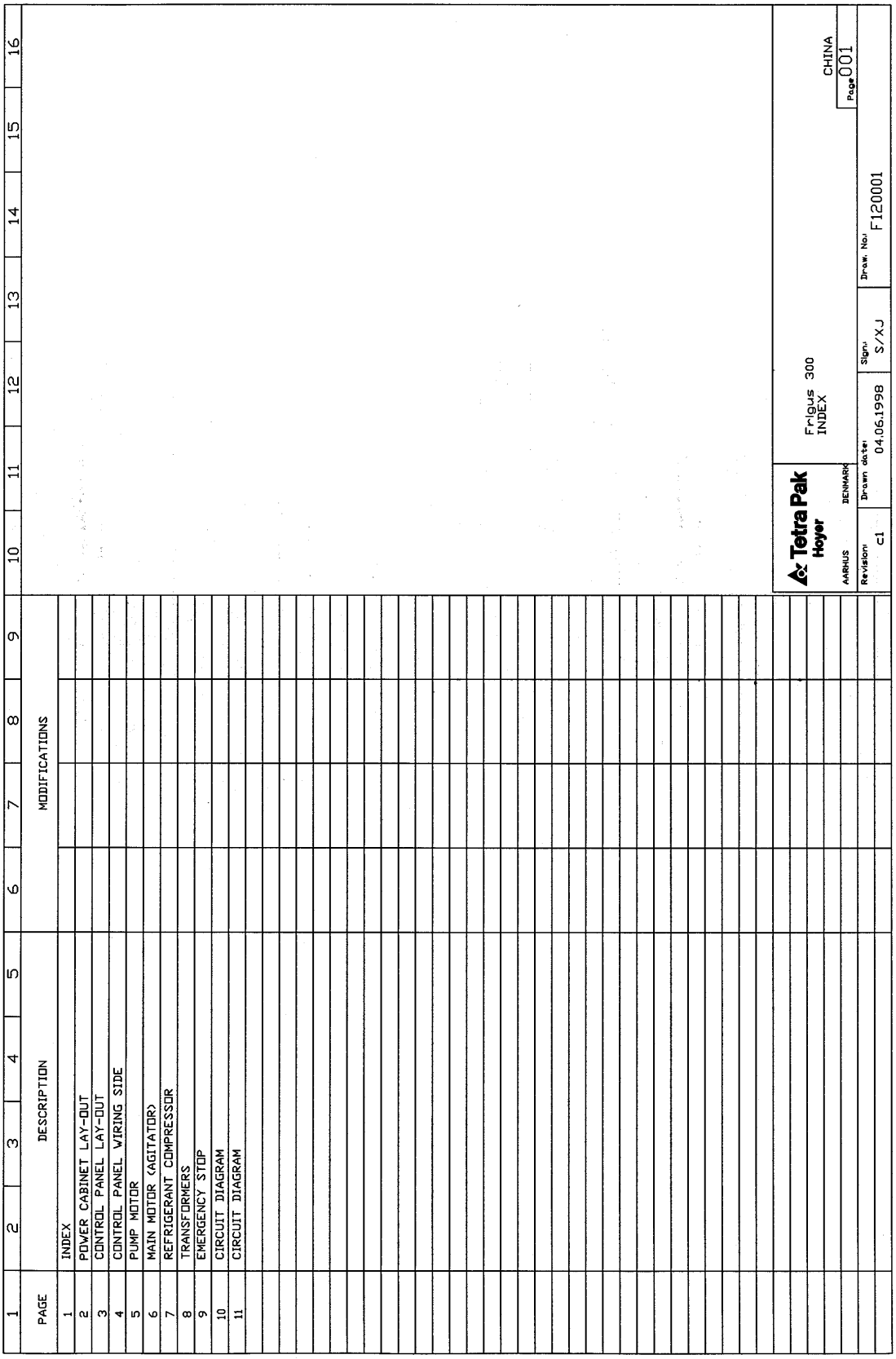
4.1 Index


PAGE
DESCRIPTION
MODIFICATIONS
1 INDEX
2 POWER CABINET LAY-OUT
3 CONTROL PANEL LAY-OUT
4 CONTROL PANEL WIRING SIDE
5 PUMP MOTOR
6 MAIN MOTOR (AGITATOR)
7 REFRIGERANT COMPRESSOR
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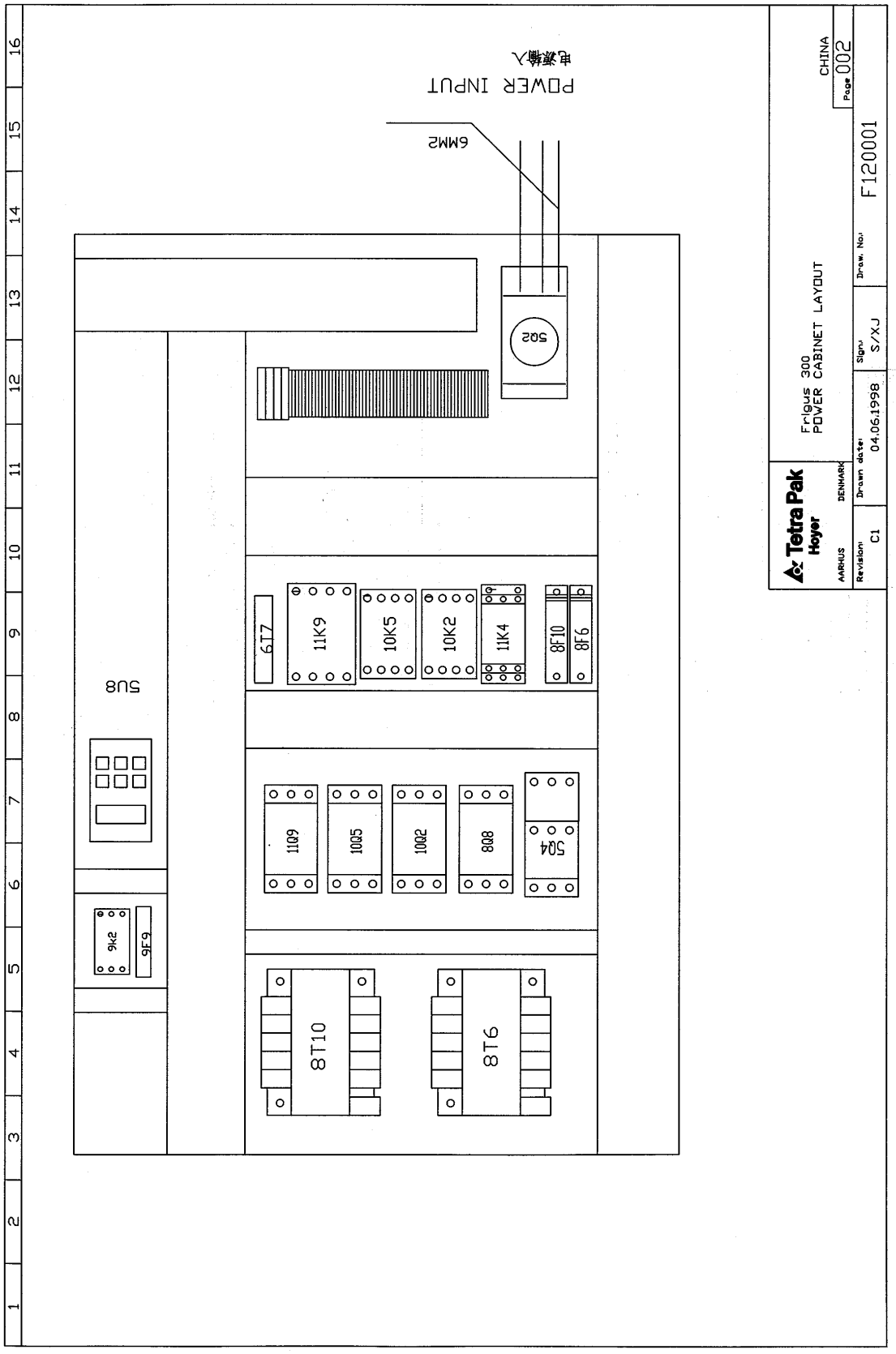
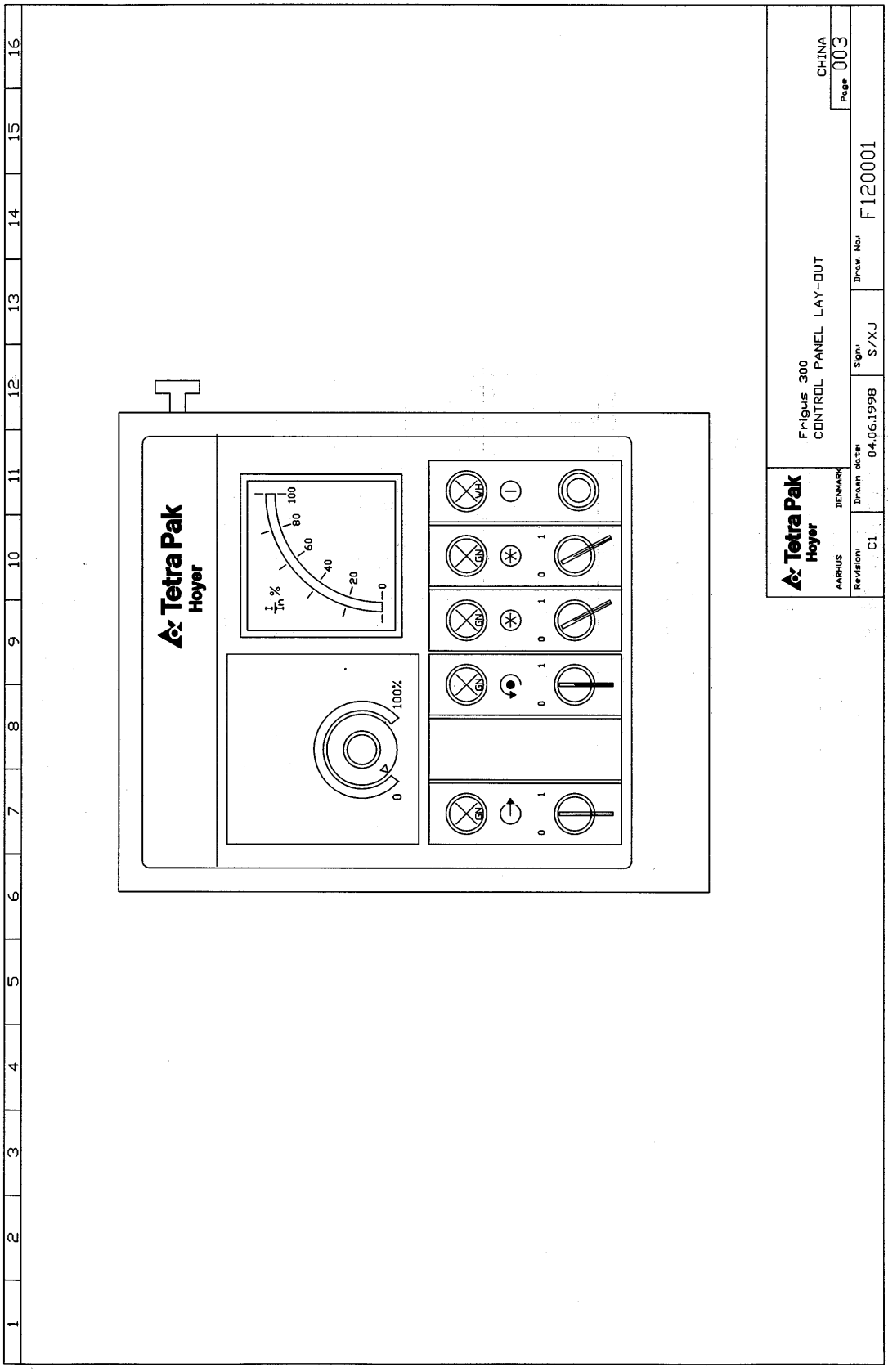
Frigus 300
INDEX
CHINA
Page 001
Revision: c1
Drawn date: 04.06.1998
Sign: S/XJ
Draw. No.: F120001

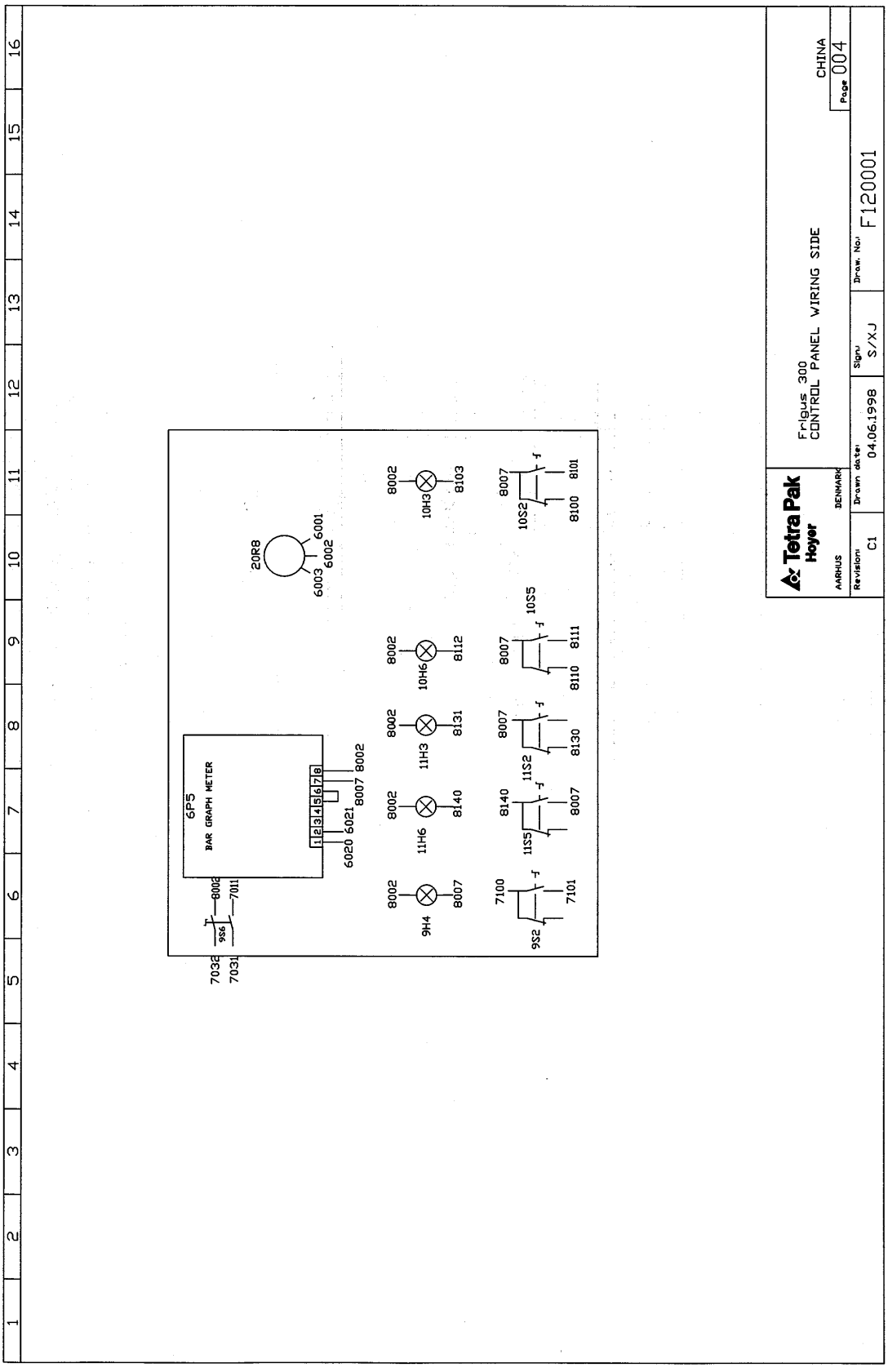
4.2 Power Cabinet Layout



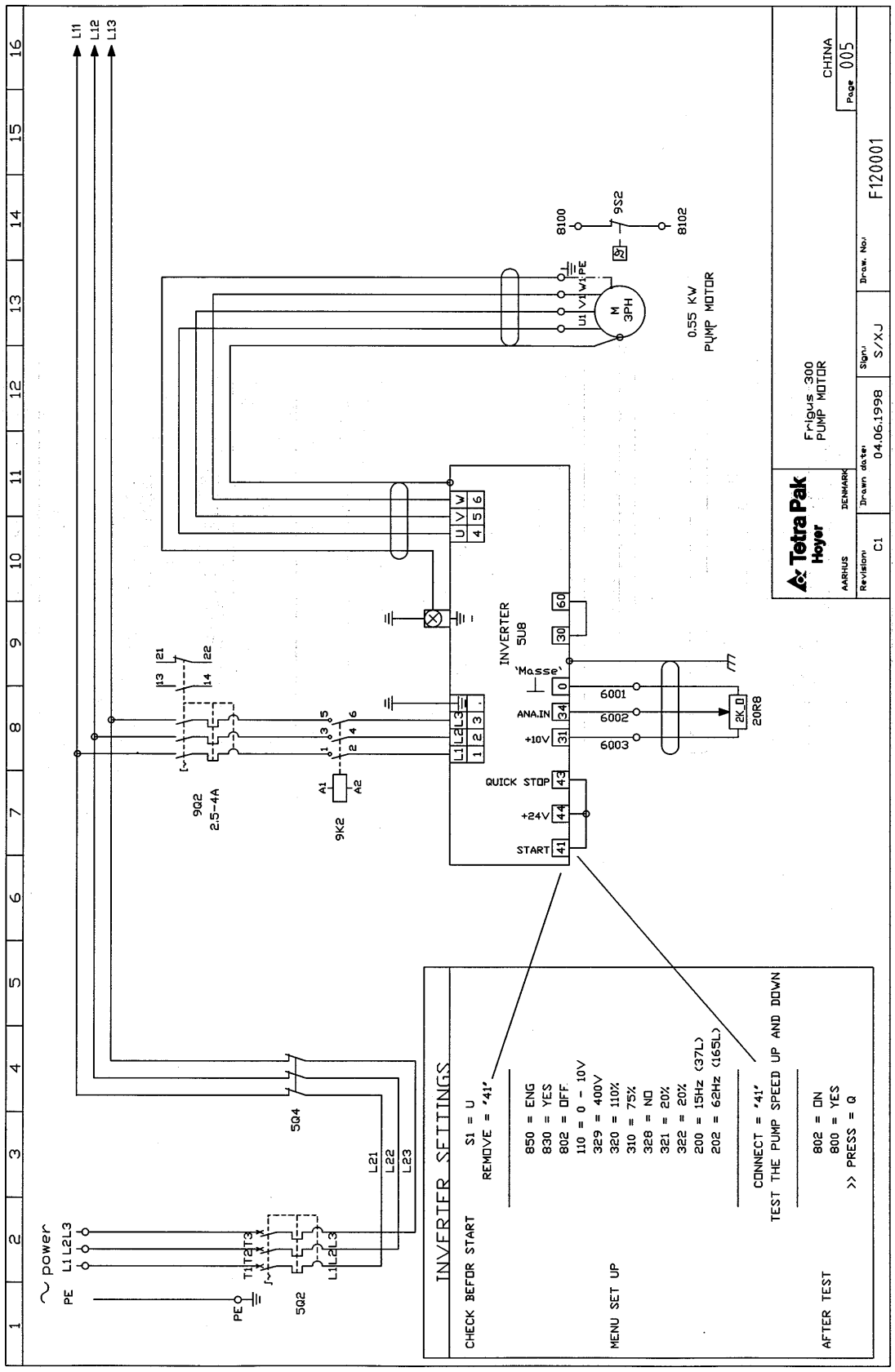
4.3 Control Panel Layout



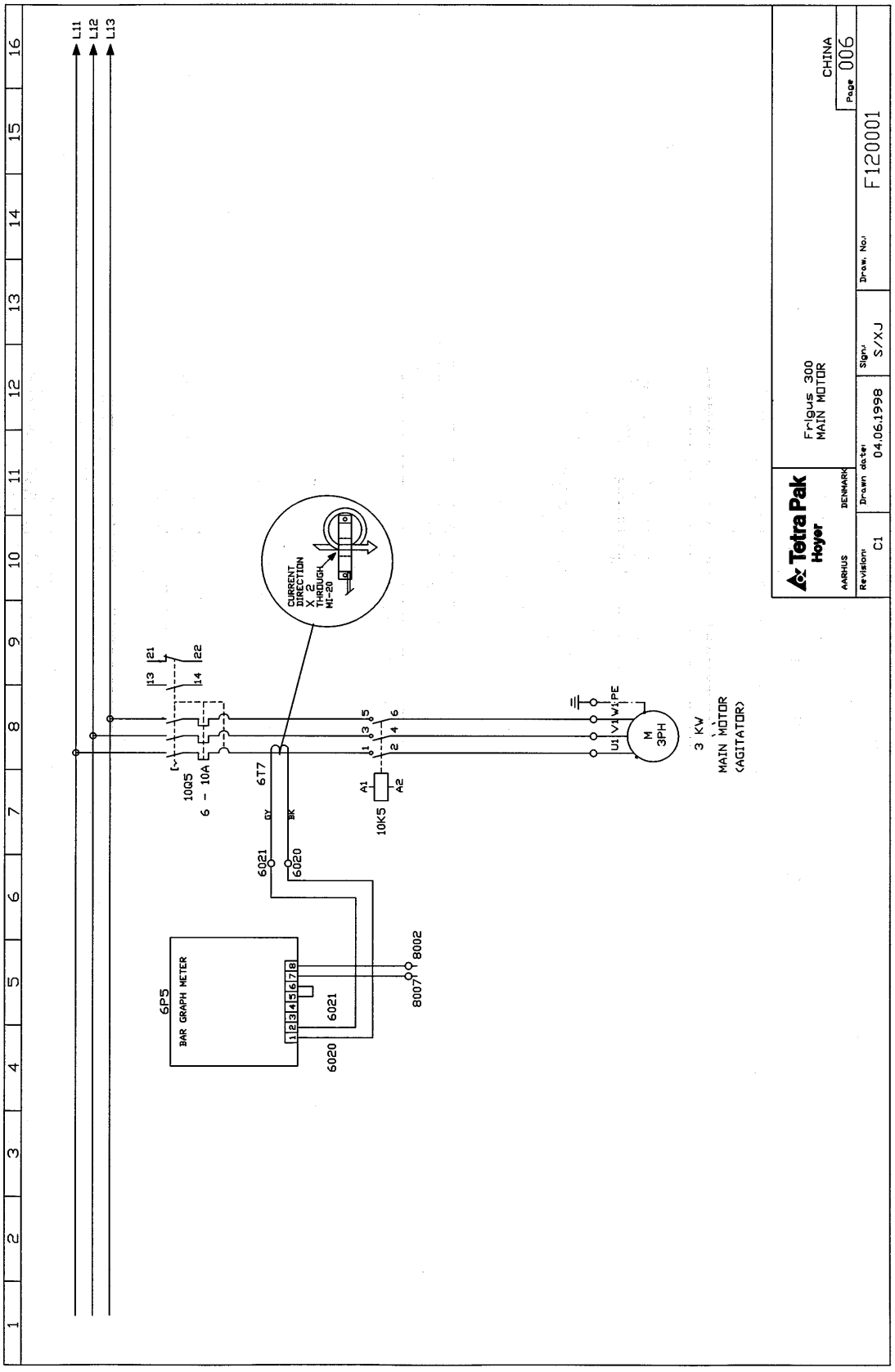
4.4 Control Panel Wiring Sider



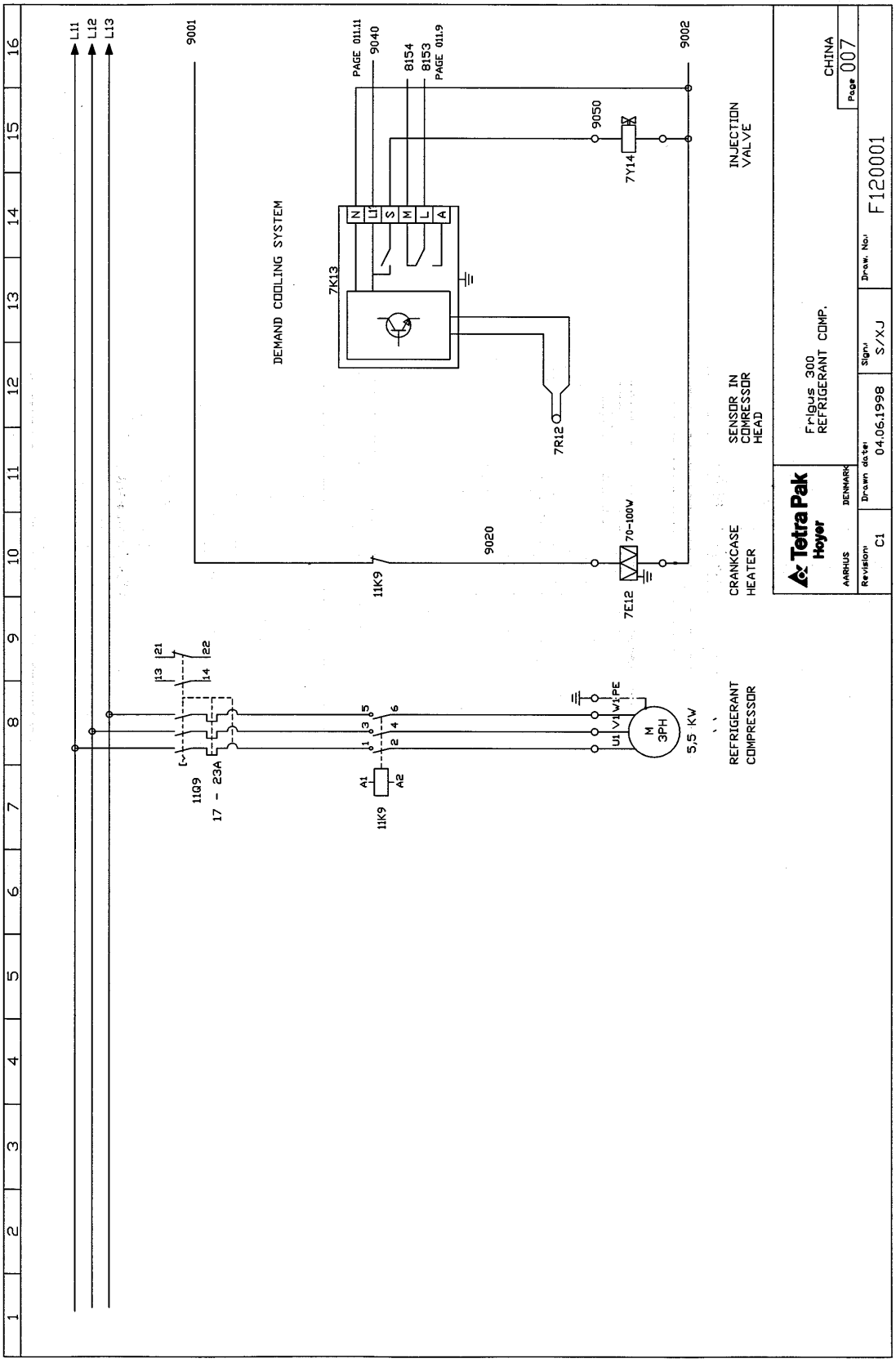
4.5 Pump Motor



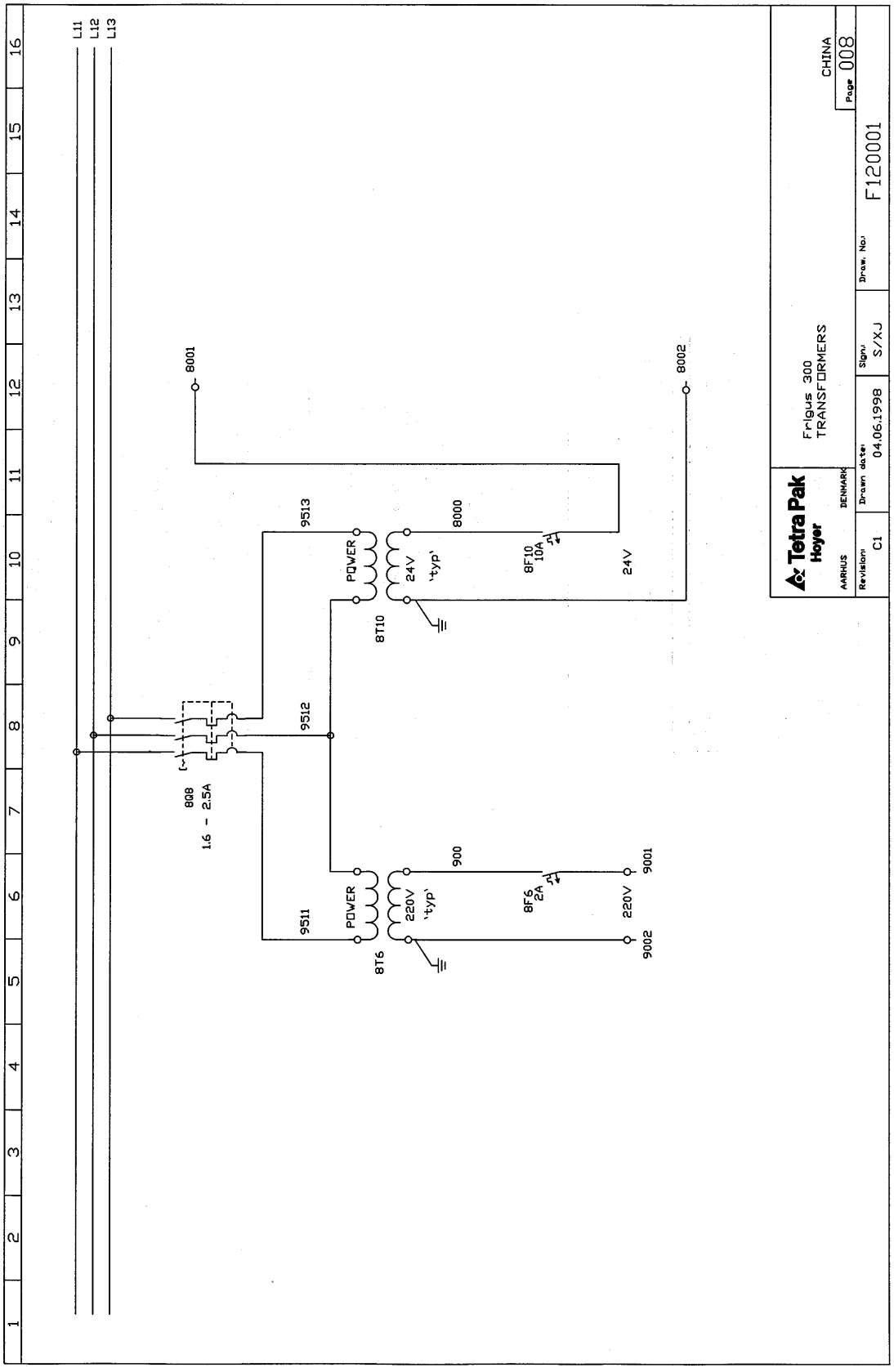
4.6 Main Motor



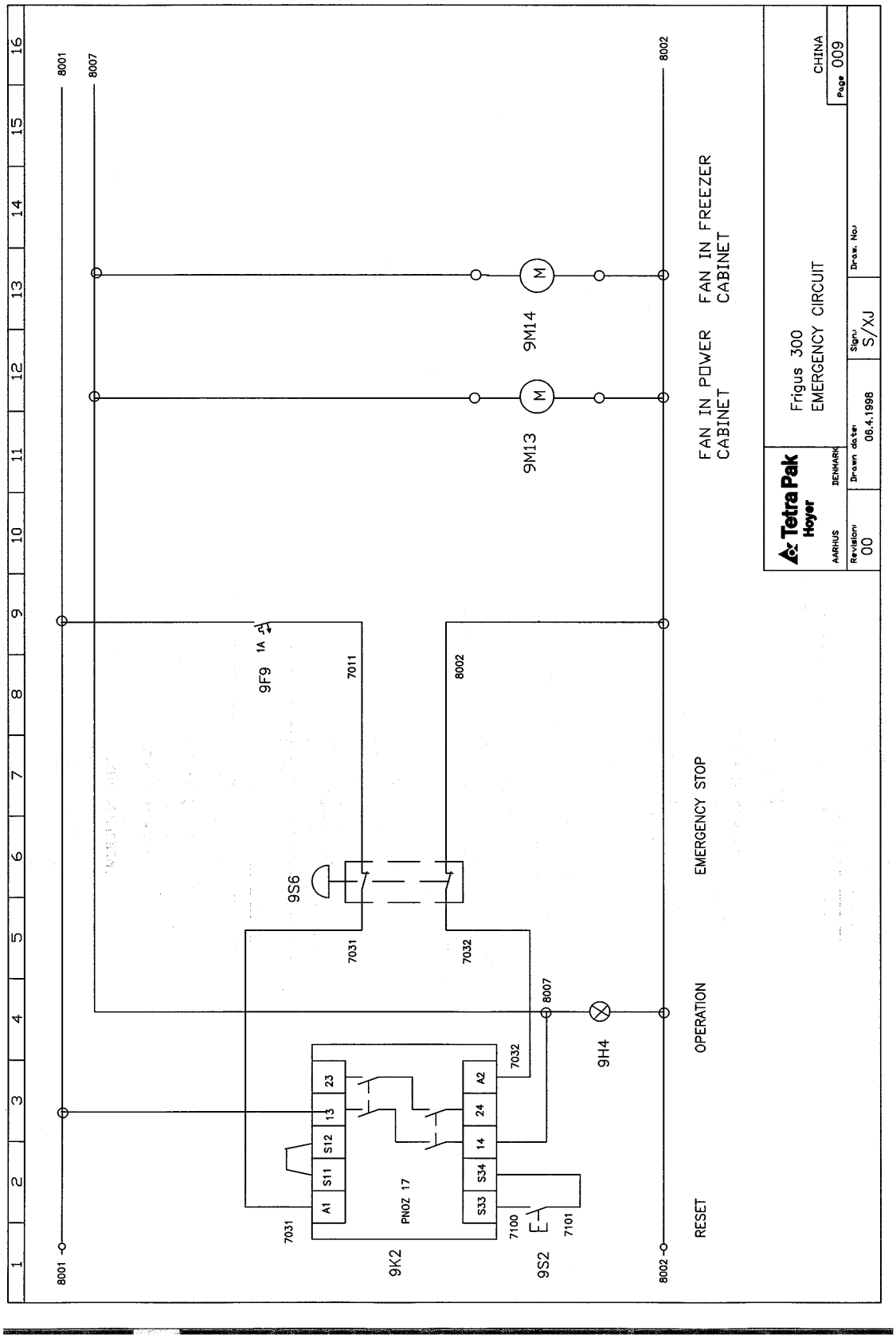
4.7 Refrigerant Comp.



4.8 Transformers



4.9 Emergency Circuit



4.10 Circuit Diagram